

# AVIATION

*The Oldest American Aeronautical Magazine*

JUNE 11, 1928

Issued Weekly

PRICE 20 CENTS



A Vought "Corsair" (Pratt & Whitney "Wasp") flying over Guantanamo Bay

VOLUME  
XXIV

## *Special Features*

The Bellanca Sesquiplane  
The "Wasp" Series "B" Engine  
The Problem of Aviation Insurance

NUMBER  
24

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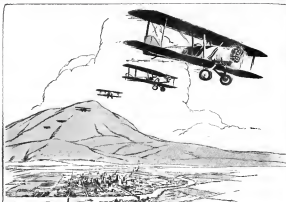
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# WRIGHT

THANK YOU FOR SUSTAINING AVIATION



The Oldest American Aeronautical Magazine

Vol. XXIV

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No. 24

## Very Much Neglected

FOR SOME considerable time following the World War no continued effort was made to develop airplanes. Last year, however, considerable experimental work was done in this direction and at the Detroit Show there were several airplanes fitted with pontoons in addition to two amphibians. The prices ranged from \$4,000 for the OK amphibian to \$60,000 for the luxurious Leaning Commercial Amphibian. There is little doubt but that from now on there will be a continuous growth, and over water flying offers many advantages.

The large growth of commercial flying last year was made possible by the experience which was gained in previous years. In considering over water flying it must be remembered that there is no such accumulation of knowledge as to how to operate properly. The few general operators have been using war surplus flying boats and amphibians and have had little opportunity to develop and perfect for commercial use the boats and airplanes which are to replace the war surplus material. It has taken a long time to develop the equipment that is replacing the war surplus material, and there is no reason to believe that this new water equipment will prove perfectly satisfactory right off the bat. But within a very few years we may expect to see a considerable amount of over water flying.

One definite thing that can be done to hasten this is possible widespread use of water craft in the development of proper facilities for the handling and storing of planes. Municipalities are spending millions in developing airports, but the development of bases for the operation of amphibians and flying boats has practically been neglected although the cost is only a fraction of that of buying and building an airport.

## Climbing off the Drome

ALTHOUGH PROOF showing statistics are unavailable, it is safe to say that a goodly portion of airplane accidents are caused by engine failure during a wing-climbing turn just after the take off. "Climbing off the drome" has a hook all its own. It is not an uncommon practice among pilots and it is a quick way of doing the field and getting back into position to "get her down again." If made worse. However, particularly in the case of low powered planes, until the climbing turn has been completed the pilot, in his experienced or otherwise, is taking an unnecessary chance. A plane in a climbing turn at a low altitude and heading down wind is in a most unhealthy position when its engine

goes dead. And in a good many cases when such a thing happens all the piloting skill in the world cannot totally avert the crash that follows.

It has been claimed and proved that the Handley-Page sloped wing and the Fokker wing will not allow the plane to go over on its wingtip, and into a spin should the engine fall on a steep climbing turn or the plane be otherwise stalled. Yet at the same time neither of these designs prevent the plane from "squeaking" and if there is not sufficient altitude in which to gain flying speed the crash follows. Perhaps less serious, but a crash nevertheless.

The goal to which those engaged in the aeronautical industry aspire is the absolute crash minimum. Such being so it follows that any ruling that tends to prevent climbing is not a red tape restriction but a progressive step in the betterment of aeronautics in general.

## Learn the Details

THE AUTOMOBILE has reached a standardization of details, gear shaft, and brake arrangement which enables an experienced driver to run any and without previous instruction. To some extent the same thing is now true of the control system of an airplane and an experienced pilot can shift from one plane to another, and under normal circumstances he has no difficulty. They should not, however, delude a pilot who is taking delivery of a new plane into thinking that he knows everything about it. There is no standardization of details, switch or instrument and every manufacturer has a different idea about gasoline gauges and reserve tank valves.

Recently two three-engined planes had engine failure because the pilots had taken for granted that they understood the necessarily complicated system of reserve tanks and gauges. Another experienced pilot had a forced landing at night because he did not know the proper action for the reserve tank switch. These examples might be multiplied indefinitely and there would certainly be a long list of crashes which could be attributed to carelessness in learning the details of a new plane.

Manufacturers and dealers should most certainly have a printed instruction book which would bring out the special points that ought to be learned about the plane. They should see that these points are brought to the attention of the pilot. But if the pilot is sure in advance that he knows all that there is to be known or amount of system or instruction will persuade him that there may be something that he could learn.

# The Bellanca Sesquiplane

Model "K" Includes Several Original Features in Airplane Design and is Powered with a Single 500 Hp. "Hornet" Engine

By RICHARD M. MOCK

THE BELLANCA Aircraft Corp., Staten Island, N. Y., has completed its first model "K" sesquiplane. This first sesquiplane, a wing distance type purchased by General Ishbell of New York City for a proposed flight to Rome, is powered with a single 500 hp Pratt & Whitney Hornet engine. The plane is perhaps one of the most original designs, following accepted principles, ever produced. The wing arrangement appears to be a further development of the lifting device made famous by George W. Bellanca and now so common in this country and being copied abroad. The leading gear is of cantilever design and extends into the lower wing stick out of the airplane, reducing the parasite resistance appreciably. The outer portion of the upper wing panel is of novel construction covered with sheet duralumin with gunmetal-plate nose, forming a very efficient type of wing tank. The fuselage follows usual Bellanca design and is claimed to produce some lift, so that practically every exposed portion of the plane contributes to the lift of the craft.

The plane has a very pleasing appearance. The outer portion of the wings and the tail surfaces are a bright yellow, while the struts are gray, contrasting with the blue fuselage and polished aluminum engine cowling. The Hornet engine is mounted on the nose of the fuselage, with the glass-enclosed propeller cocked behind the engine and in front of the main fuel tank of about 800 gal. Behind this tank is a large compartment for the radio operator and navigator. The plane has been fitted for a long distance flight and thus equipped,

plane for 14 people, at about 2,000 lb. dry load, is 2,600 lb. With this load it is calculated to have a high speed of 110 m.p.h. and a landing speed of 54 to 58 m.p.h. The climb should be close to 800 f.p.m. and the service ceiling 15,000 ft. It is estimated that a smaller model, with a 340 hp. Warner engine



Side view of the Bellanca Sesquiplane. The plane has been streamlined for "Hornet".

and fixed, or retractable, landing gear, is under construction as a passenger carrying type.

The model K may be said a teaching airplane. The outer bay of the upper wing is pin jointed to the inner bay. The outer bay is supported by the so-called secondary wing rib. The lift struts from the inner bay of the lower wing to a point in about 75 per cent. of the span of the upper wing. The upper wing has a considerable overhang and has a total span of 64 ft. 6 in. The secondary wing has a double upper part, it is tapered both in thickness and in chord. At the root it has a chord of 70 in. equal to that of the lower wing and at a point about five feet below the main or upper wing, where the lift strut actually terminates, the chord is 28 in. From here it branches into two streamline members, each going to one of the spars of the main wing. The outer bay of the main wing has no dihedral, while the inner bay, which is really a 220 gal wing tank, is set at a positive dihedral of 3 deg. The inner bay of the lower wing, which houses the landing gear, when folded, is set with a negative dihedral of 8 1/2 deg. to reduce the length of the landing gear members. The secondary wing is set at a high positive dihedral, securing the lateral stability of the plane. The main wing has a standard Bellanca section of 80 in. chord. It does not rise in either plan or thickness. The inner bay of the lower wing has a modified Clark Y section, though it is of much greater thickness, while the lift strut is another Bellanca-D. streamlined section. The span is said to lift considerably more than its own weight. As fact, it is a member very out of the proposed area (taking approximately two thirds that of the inner area of the upper wing). The main wing is rigged with a 2 deg angle of incidence, while the incidence of the secondary wing varies from 1 to 3 deg. increasing towards the upper wing. The reason for this is that as the gap between the

June 11, 1928

gap decreases, the downwash increases, thus the effective angle of incidence of the strut is the same.

In construction, the structure of the main wing follows accepted practice, except that the spars are solid spars with a setting. They are comparatively narrow and quite deep, the ribs are the same as those on other Bellanca planes, except of course, that they are of larger chord. The cap strips are made out of a light gauge flat wire grooved in the middle to which is with a plate and lashed so as to form the lattice T. The main bracing, making up a Warren truss is made of two spars fastened to each side of the web, balsa wood being glued in between to make them work as a column. The ribs are attached to the spars by triangular blocks on each side of the spars. The compression ribs are similar to the others, except that these are additional stiff, rectangular sections, which members are each side of the ribs between the spars. The wing bracing is completed by a set of Howard Harbison struts. It is interesting to note that the aluminum entered the side length of the outer bay and the overhang of the upper wing.

## New Wing and Tank Combination

The inner bay of the upper wing, as has been mentioned previously, is a 220 gal. wing tank built as far as the rear as that is, the covering is of sheet duralumin with gunmetal-plate nose. The internal structure is of conventional metal wing design. The forward spar is of 3 sections made up of a very strong web with the spars on the back. It is lightened by a number of holes which allow for the gasoline to flow over the leading edge backward. The rear spar is also a sheet being backward. This has no lightening holes, as gasoline is carried in the trailing edge. Every second rib of a Warren truss construction, while the others are solid, with solid holes at the top and bottom to permit the flow of gasoline and yet prevent the gasoline from reaching from rib to rib to the other where the plane is loaded. The truss is not so built up with extended leaf type spars for cap ribs and main bracing. The interior of this wing panel is less left unobstructed, while the outside is protected by armored canvas. The internal structure is capable of withstanding the high explosive loads caused by the main wing when the end of the metal covering, giving an additional safety factor besides holding the gasoline. This portion of the wing, taking a very high compressive load, weighs 200 lb. and is the same as 64 sq. ft. the weight is 1 lb. per sq. ft. or 64 lb. per gal. It is claimed that this combination of wing and tank has never been made before, either in this country or Europe. The apparent advantage of the wing tank panel lies in the fact that it weighs less than the com-

AVIATION

1675

pressed weight of the ordinary wing and tank built separately and in the further fact that the wing is stronger. The entire panel of the wing is pin jointed to the wing tank and supported by an X struts between the upper and lower wings. Weight of upper panel is 1.1 lb. per sq. ft. of area.

The inner bay of the lower wing houses the landing gear. It is of extremely heavy construction to provide the strength



Picture of full cantilever landing gear showing flaring for sheet aluminum and retracting struts.

for the full cantilever mount for the wheel at the outer end of the panel. Plywood is used to cover this portion of the wing, which employs heavy rectangular spars, ribs and wood ribs for the internal structure. There is a large circular opening in the lower surface to provide for the extension of the landing strut. This portion of the wing, because of the cantilever construction, is rigid in both plan and thickness. It has an 84 in. chord at the root and a 70 in. chord at the inter-panel strut point. This chord of 70 in. is the same as that of the root of the main wing or left strut.

The landing gear is located in the entire end of the lower wing panel. The wheel is mounted somewhat under the forward spar so that the X type airframe struts carry most of the landing load. The forward member of this X strut, over the wheel, is of streamline steel tubing like the other strut, however.

Continued on page 1704



Close up front view showing the "Hornet" engine and recesses in lower wing for landing wheels.

weighs 4,000 lb. empty with tanks, instruments, fuel, etc. The tanks have a total capacity of 1,500 gal. of gasoline which should permit single for a range of approximately 3,000 m. No load has been made at the time of this writing, but it may be possible to add about 20-30 gal. more of gasoline, thus bringing the full load up to about 15,000 lb. with still a conservative load factor to provide a safe take off. The estimated weight of the same model, as a commercial passenger



Bellanca Sesquiplane Model K, powered with a Pratt & Whitney Hornet engine.

# Fuselage Analysis

## Stress Analysis of Commercial Aircraft, Chapter Number Thirteen

By PROFESSOR ALEXANDER KLEMIN

Head Department of Aeronautics

And GEORGE F. TITTKERTON

Chief of the Bureau of Aeronautics, Navy Department

IN THIS chapter the fuselage will be analyzed for the high incidence and level loading conditions. The method of analyzing for low incidence is similar to that for high incidence. The effect of wing or torque will also be investigated and the loads obtained added to those found in the high incidence analysis.

### High Incidence Fuselage Analysis

In this condition the fuselage is subjected to the panel loads due to the weight of the structure it supports, to the lift and drag reactions of the wing in the high incidence condition, to a thrust load on the nose of the fuselage, and a tail load applied at the rudder post to maintain equilibrium. The loads must all be found and placed in their correct positions on the fuselage truss before the graphical solution can be begun.

The panel loads listed in the table in the previous chapter are and panel loads due to the relative weight of the plane. We must now subtract that portion of the panel loads due to the wing weight and then multiply all the panel loads by the high incidence load factor. This has been done in the following table. Columns 1 and 2 were obtained directly from the table of panel loads. Column 3, the design high incidence panel loads, is obtained by multiplying column 2 by 1.572. It is the high incidence load factor but since we are taking only one side of the fuselage truss we use only half the loads.

### Design Panel Loads—High & Low Incidence

	(1)	(2)	(3)	(4)	(5)
			135 --	140 --	145 --
			(1)	(2)	(3)
			Panel	Panel	Panel
			Load	Load	Load
			due to	due to	due to
			Wind	Wind	Wind
Panel	Unit	Panel	Weight	Weight	Weight
Point	Panel	Panel			
	Load	Load			
10	15	15	35	62	62
11	21	21	23.4	91	91
12	28	28	26	200	200
13	35	35	45.6	157	157
14	42	42	142.5	400	400
15	49	49	217.5	476	476
16	56	56	300	1000	1000
17	63	63	301	1046	1046
18	70	70	164	910	910
19	77	77	146	31	31
20	84	84	5	12	12
21	91	91	6	20	20
22	98	98	5	13	13
23	105	105	5	17	17
24	112	112	5	17	17
25	119	119	34.7	56	56

# The "Wasp" Series "B" Engine

By GEORGE J. MEAD

Technical Editor of Aviation

ON FEB. 18, 1928, the new Series "B" "Wasp" completed its official Navy 50 hr. test with outstanding success. For Naval purposes the Series "B" "Wasp" is rated at 450 hp. at 2100, as compared to the rating on the older Series "A" of 416 hp. at 1900.

The engine was operated throughout the period developing substantially more than its rated power, or about 460 hp. There were no delays due to mechanical difficulties or otherwise, and upon completion of the test and tear-down the Navy inspectors certified that the engine in all detail was in perfect condition. Most striking of all, however, is the fact that upon completion of the standard 50 hr. test the same engine was then operated successfully for five hours developing 536 hp. at 2100 r.p.m. This is in line with the usual practice of Pratt & Whitney, to subject the first of each type of engine to a severe proof-test. Again, upon tear-down, the engine was found to be in excellent condition.

During 1857 about 300 Series A "Wasp" engines were delivered to the Navy Department, and approximately 50 de-



A Vought "Corsair" powered with a "Wasp" blasting on the water.

scribed in commercial plants. In Naval service "Wasp" engines are used in the single seat fighters, two seat observation, and amphibious types. In commercial service "Wasp" engines are installed in some 50 different types of planes ranging from the cabin type four seater to the giant transporters. Boeing Air Transport alone has operated 25 Series A "Wasp" engines almost a million and a half miles in its trans-continental mail planes. In other commercial work,



Front quarter view of the "Wasp" Series "B" 450 hp engine.

and supplying Naval and Army service, and from of sales have been flown by Series A "Wasp" engines under almost all conditions of temperature, service, etc. Pratt & Whitney engineers have closely followed these product in service, and have accepted every opportunity to further improve the older design already given by the Series A. From the accumulated wealth of all flight experience of the predecessor, the Series B is the refined model thus made possible.

The primary modification in the "Wasp" Series B is to provide for a higher r.p.m. and a correspondingly higher power rating for Naval and military purposes. The actual high speed of the Series B engine is 2100, as compared to 1900 in the older series. Quarter-inch horsepower is correspondingly increased from 416 to 450. A year of experimental testing was employed to develop the advisable modifications, together with service experience.

## Crankshaft Diameter Increased 3/16 in.

The crankshaft pin has been increased 1/16 in. in diameter, permitting of increased strength in the shaft, but primarily to provide greater bearing area for the increased loading.

An entirely modified cylinder is employed on the Series B which provides, in general, for better cooling and increased compression at the increased r.p.m. The cooling fins on the short cylinder barrels have been increased in number from 10 to 15, and are much thicker in section. The cooling fins of a burner type, and provided with horizontal cap inserts. An improved combustion has been perfected for fueling in the Series B. The exhaust valves have been changed providing for more thorough, particularly when the valve is operating at high temperatures.

The general design of the piston conforms to the type used in the Series A. However, the Series B pistons are longer and stronger, and are now made from a permanent mold.

The standard valve in the Hoover gear for the control

valve motion mechanism has been changed from 5 to 1 to 7/8, and the mounting is of the full floating type, and provides a slipping member to successfully take care of the quick acceleration and deceleration of the engine. With the standard setting of the valve and the 7/8 gear action, there is no superheating effect on the standard models. However, the design modifications indicated provide for valve pressure higher than 7/8, through which a reasonable amount of superheating can be obtained.

On some great number of similar modifications have been incorporated in the new engine, all of which are intended to add to its useful life, as well as to provide adequately for the higher power rating. While certain parts are not interchangeable between the Series A and B engines, the engines are entirely interchangeable as to installation in the airplane. The installation points are identical, so there is no difficulty in replacing one type with the other.

## Flight Tests Give Final Proof

Such is said and claimed for various new types of powerplants, both air cooled and water cooled, but Pratt & Whitney engineers have substantiated both in the all around merits of the single row air cooled radial "Wasp". The final proof of all theoretical suggestions as to engine types must come from the results of flight tests. It is generally admitted that because of its comparatively lower weight per horsepower the single row radial offers the best opportunity for performance in climb and at altitude. It is truly stated that high speed is inseparable with the single row air cooled radial type. Let us consider these statements in the light of proven facts.

Official Navy type test records credit the Curtiss "Hawk" power plant with high speeds within one m.p.h. at each other when fitted with either the water cooled 600 hp. Vee or air cooled radial "Wasp". From two engines are selected in types because their power rating is substantially the same. General proof of the accuracy of the above report may be seen by reference to the National Air Races at Spokane last fall. In the "Free for All Military Pursuit Race" the Curtiss Hawk equipped with a "Wasp" and flown by Captain Rogers, is credited with an average speed of 131.000 m.p.h., falling ahead of all of the Army P12's which is the Hawk equipped with the water cooled 400 hp. Vee, whose high speeds were slightly less. This is certainly proof that at equal power the single row air cooled radial can meet and equal the high speed of the water cooled Vee.

A recent description credits the Curtiss "Falcon"—a standard five place observation type—with a high speed of 115 m.p.h. when equipped with a 500 hp. air cooled two-row radial, and further indicates that this approximates the high speed of the water cooled Vee engine of equal power when

fitted in the same type of plane. The Vought "Corsair" is also a standard two place observation type. It was actually designed about the air cooled "Wasp", and takes full advantage of the lighter weight characteristics of the single row radial. Recently a stock Corsair with a Series B "Wasp" engine flying as a seaplane, with Lieut. S. W. Coffey, U. S. N., as pilot, carrying an observer, in Naval fighter load, and with every



Overhead test, "Wasp" Series "B" Feb. 24 and 25.

the landing lights is positive, was officially timed over the Navy straightaway course at Anacostia, D. C., at 150.3 m.p.h. It is pointed out that in the above test the Falcon with the 600 hp. air cooled engine was flying as a light land plane. It is of further interest for comparison that the landing speed of the Corsair is approximately 50 m.p.h., as compared to more than 60 for the Falcon when equipped with the 600 hp. air cooled or water cooled powerplants. The Corsair which was used in the above indicated high speed trials was delivered only three days previously. The plane and engine had had less than four hours flying before being sent over the speed course. It must be taken into account that the Corsair is designed both for the strain of catapult as well as the straining gear on the aircraft carriers, for both of which is required an exceptionally sturdy plane. In view of the above comparison, it seems hard to conclude that the single row radial has handicapped the high speed characteristics of the Corsair, much so we believe that the Corsair is of excellent design.

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The Fokker F-10 mail and passenger plane powered with three Pratt & Whitney "Wasp" engines.

# The Problem of Aviation Insurance

By HENRY H. BALOG

IN EVERY properly-run business the ordinary and extraordinary risks are covered by insurance. When a business company loses money on an automobile, the risk is simply covered by insurance in case of fire, theft, and perhaps on other risks. The passenger line and the trucking companies, for instance, would protect their loss and liability by taking out insurance. A good many airport and air field operations, however, think they can bank the grace of insurance by a system of their own. This system amounts merely to taking a chance. It is surprisingly true that a considerable number of operators and manufacturers who, in the back-porch business, say, would protect every cost of an aircraft with insurance policies at every turn, will in the aeronautical industry take a blind plunge and still think themselves good business and sound men of business. Just one crash, with its attendant lawsuits on various kinds of liability, might easily bankrupt even a large operator. Of course the crash may never come. On the other hand it is just as well to remember that last year there were 214 per cent of fatalities among the licensed airplanes.

## Aeronautics Needs Capital

The banks and other financing institutions know all this and refuse to lend money on an unsecured aeronautical project just as they refuse to lend money on an unsecured real estate project. That the men who take in their own money into aeronautical manufacturing, operation, or service, often think they know better than the banker here to the business, should be business men in the risks, it is not only his own hard luck, but it gives the whole aeronautical industry a setback by increasing public suspicion and slowing off capital. An enterprise in the industry knows, common safety needs money—lots of it, and right away. Adequate insurance, covering all risks of an air service, port, or facility, will contribute to advancing the requests needed by proving that aeronautical aviation is as safe and sane as a business proposition can be. Because of the unusual number and size of aviation risks, insurance is unusually more important than in other lines of endeavor, and only by means of intelligent and adequate insurance can the industry achieve the degree of financial stability upon which a progressive business policy can be built.

At the beginning of 1938 there were 19 states (Delaware, Idaho, Maryland, Nevada, North Dakota, South Dakota, Pennsylvania, Tennessee, Utah, and Vermont) besides Illinois, which required all planes in carry insurance covering property damage and personal indemnity at least. In a number of other states there has been a greater or less amount of talk about similar legislation, and there can be no doubt but that shortly aviation insurance will be compulsory more or less everywhere.

The outstanding risks met with in aviation are accidents to personnel, accidents to material and equipment, such contingent risks as public liability and property damage, and passenger and cargo risks. Insurance coverage for all risks

is now available to a gross amount of over \$750,000 per year, and, effective for either a short or a long period. The expense of such insurance is almost negligible to smaller-scale aviation insurance, although there are a large number of valuable factors which under adverse conditions can force the premium rate a great deal. For instance, the premium rate on a well-kept biplane would naturally be higher than the rate on a 1938 model tri-engine transport, and the rate on a cross-country plane would be higher than the rate on the same plane used only on a lighted airway. By the very nature of the industry as well as the rate, while scheduled cargo or passenger transportation will keep the rate low.

An important factor in fixing the rate is the experience and clean record of the pilot. A man who has had an unusual number of accidents would not be considered a good risk, while a man with a long and clean record would bring the insurance premium down. On the ground and the situation is analogous. A properly designed airport and fireproof hangars keep the risk down, while 24 hr. constant service, air transportation both in the hangars and in the planes, and a strict adherence to an open door or lighted airway, are of course also required. In short, the attitude of the insurance companies is to charge as small a premium as is compatible with the risk, and to give as much credit as is possible for safety factors tending any aspect of the risk.

## Not Rooked by Petty Claims

For the operator with facilities for repairs, an easy and economical way of reducing the insurance premium is to increase the "deductible," or minimum amount at which the insurance company begins to be liable for compensation in the policy holder. In most cases damage amounting to less than 10 per cent is not payable by the insurance company, although the liability, expense, and waste of time deductible is usually 5 per cent and the theft, robbery, and pilferage deductible is the full sum of \$50. Thus the insurance company is relieved of a tremendous burden of petty claims, and is able to keep rates lower than would otherwise be possible.

The operator who wishes rates lower than the standard can secure them by setting the deductible at, say, 20 per cent, taking upon himself the expense of making repairs of a value within the deductible. For the operator with an adequate ground organization this method has proved especially in reducing his fixed charge the amount of insurance without greatly increasing his payroll and materials accounts.

Another form of the same idea is partial self-insurance, or "co-insurance," whereby the owner takes the small part of insurance at a certain percentage of the estimated value of the risk, and the insurance company is liable only for that percentage. For instance, a plane valued at \$10,000 at the time of application is insured in the principal amount of

# The Boeing B-1D Flying Boat

New Boeing Design is a Three Passenger, Closed Cabin Boat Powered with a Wright "Whirlwind" Engine

THE BOEING Airplane Co., Seattle, Wash., has designed the Boeing B-1D flying boat, that has a capacity for three passengers and a closed cabin. It was originally designed for the Boeing mail line between Seattle, Wash., and Victoria, B. C., for the past eight years. It will be built for the U. S. Navy by the Boeing Airplane Co. and will be used for mail delivery. The wing design of the B-1D has been modernized and accounts of a single bay structure. The wooden hull has been replaced by a metal hull and the three passengers and pilot are carried in a glass enclosed cabin. The Pratt & Whitney 14-200 hp engine has been replaced by a Wright Whirlwind. The new engine is also enclosed with a pusher propeller and is contained in a streamlining nacelle behind the wing. The B-1D weighs 2442 lb. empty and carries a total load of 1800 lb., making the total weight 4242 lb. The design of the new design, has had a Pratt & Whitney 14-200 hp engine installed and the first of this type is now in test at the Boeing Airplane Co., Seattle, Wash. The B-1D is a three-engine flying boat in operation with the Pratt & Whitney Airplane Co., Seattle, Wash. The B-1D is a three-engine flying boat in operation with the Pratt & Whitney Airplane Co., Seattle, Wash. The B-1D is a three-engine flying boat in operation with the Pratt & Whitney Airplane Co., Seattle, Wash.



Side view of the "Flamingo" powered with a "Whirlwind" engine. This plane is now making a demonstration tour of South America.

plywood panels at the ports. The landing gear of both wings is covered with plywood to preserve the proper shape of the airfoil. As there is no center section, the wing is built in four parts, two upper and two lower. The main struts and ribbracing struts are of round steel tubing laced with light air spruce to give a streamline section. The wings are braced fore and aft, and for lift and landing, by streamline bi-planes in the usual manner. The outer ribbracing struts are vertical, while the main struts from the side of the hull, converge to a point where the upper wing panels are attached. The forward part, supporting the fuselage

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Front quarter view of the Boeing B-1D powered with a Wright "Whirlwind" engine.

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## Rolls-Royce, Ltd., London, Now Producing The F 11 and F 12 Water Cooled Engines

ROLLS-ROYCE, LTD., London, is now in production of the Rolls-Royce F 11 and F 12 water cooled engines which were recently approved by the British Air Ministry after an official 300 hr. test. Both the F 11 and F 12 are geared drive engines of essentially the same construction differing only in gear ratio. The rated power is 400 hp., though the engines have developed 535 hp. They differ radically from the Rolls-Royce engines produced in the past, there are 12 cylinders arranged in a 60 deg. V with one in each bank but each bank to a single unit containing all of the cylinders rather than have each cylinder separate. The cylinder blocks are aluminum alloy castings with steel liners for the cylinders. Cylinder heads are integral with the blocks and have two intake and two exhaust ports per cylinder. The valves are actuated by a single cam shaft over each bank. These cam shafts are actuated by a system of bell gears connected to the vertical shaft driven by the necessary drive in the rear. Matched aluminum alloy forgings are used for the pistons. They have a bore of five inches and, since the stroke is five

## British Blackburn Napier Ripon II Bomb And Torpedo Plane Successfully Tested

WORLD tests of the Blackburn Napier Ripon II, a prototype carrier capable of carrying a torpedo weighing 3,500 lb., or a number load of bombs. It is a conventional open cockpit biplane powered with a Napier Lion engine. There are two cockpits in tandem, the forward one being fitted for the pilot and the rear one for the gunner or bomber. On the plane



England's new torpedo and bomb carrier, the Blackburn Napier Ripon II. It is reported that successful tests have recently been made with the new plane.

on the British Air Ministry's recent test, details of its performance match its given one. It is said to have a speed over 120 m.p.h. with a fair landing speed and quick take off.

## Short Air Services, Detroit, Inaugurates

**Air-Rail Passenger System to Ohio Points**  
STOUT AIR SERVICE, Inc., of Detroit recently inaugurated a short air service whereby passengers on the company's Detroit-Cleveland airline may continue to various Ohio cities by rail from the Cleveland Airport. Arrangements for this new system was made with the Cleveland Southern Railroad Co.

In changing from planes to the railway at the airport, officials of the Stout company point out, passengers will avoid the slowest portion of the rail journey—the run through Cleveland, itself.

The Cleveland Southern railway borders the airport on the southeast of the city. Direct passengers on the air and bus may purchase through tickets to the Ohio cities of Maum, Woroster, Ashland, Mansfield, Dayton, and all to intermediate points. Tickets may be bought in Detroit, or at any point reached by the railway.

## Apache Air Lines of Phoenix, Ariz., Buys

### Mercurio Powered Brown-Mercury Plane

APACHE AIR LINES, operating a daily passenger service between Phoenix and Prescott, Ariz., has opened the season with a successful flight and acceptance of a new Brown-Mercury monoplane. The initial flight was made with its passengers, Larry Brown, president of the Brown-Mercury Aircraft Corp. of Los Angeles, made delivery of the new plane in person. The new monoplane is powered with a 60 hp. Mercurio-Baldwin engine. It is an open cockpit, 6-1/2 passenger plane.

Brown is a pioneer, having entered aviation in 1923. With Lewis Beady and Katherine Stinson, he founded an aerial line that toured the country in 1924.

## Fast Definite Steps on National Air Tour Are Announced by Detroit Board Official

WITH SEVENTH being regularly assumed from the published plane, Earl B. Bell, assistant manager of aircraft, said in the Detroit Board of Commerce, has announced the following steps on the National Air Tour.

**June 12.** (June 12) Ford Trophy, which is to begin from the first airport June 12.

**June 13.** (June 13) Indianapolis will be a secondary stop on the route day. G. M. Williams, president of the Indiana Motor Car Co., at the Indianapolis airport.

**June 14.** (June 14) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7. May 12, London, Ohio, will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 15.** (June 15) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 16.** (June 16) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 17.** (June 17) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 18.** (June 18) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 19.** (June 19) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 20.** (June 20) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 21.** (June 21) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 22.** (June 22) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 23.** (June 23) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 24.** (June 24) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 25.** (June 25) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 26.** (June 26) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 27.** (June 27) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

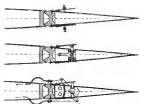
**June 28.** (June 28) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 29.** (June 29) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

**June 30.** (June 30) Springfield, Mo., will be a secondary stop on the Springfield, Mo., on the morning of July 7.

## Balance Mechanism for Control Surfaces Developed by the Niapport-Delage Company

In a recent edition of the French publication, *l'Aéronautique* there appeared a description of a device developed by the Société Anonyme Niapport-Delage for the balance of control surfaces, especially the elevator. It consists of a pair of longed flaps on the upper and lower surfaces of the control near the leading edge. Normally the flap is flush with the surface and has no effect, however, should one be raised it will disturb the air flow over that surface and cause an air flow towards the side with the raised flap. The flaps may be adjustable either on the ground or in the air. A sketch



was used on the ground with a screw mechanism, controlled from the cockpit, can be adjusted in the air. Another method suggested is to use a wire between the flaps and have the flaps held against the wire by springs. The Société Anonyme Niapport-Delage manufactures parallel planes for the French government.

## Aero Conference, Airport Dedications, and Flying Contests are Scheduled at Boston

EVENTS on the Boston aviation calendar in the next 24 hours are: June 15, lectures opening of the Hyattsville and North's Vineyard airports, June 21-22, New England Council of Aeronautics Conference at Boston; June 23-25, Lowell Airport dedication and flying meet, June 25, Beverly Airport field meet.

The recent week-end of June 23 saw much activity with the dedication of the new Beverly Airport. Another great event of importance was the dedication of the Guggenheim Aeronautical Laboratory at Massachusetts Institute of Technology on Monday, June 4.

## House Passes Bill Authorizing Commission To Name First Successful Flying Machine

A BILL has passed the House of Representatives authorizing the President to appoint a commission of five distinguished citizens of the United States to whom Orville Wright, and all other persons in any other way interested, shall be publicly invited to present evidence as to which was the first man to heavier than air flying machine. The report is to be transmitted to Congress by Nov. 1, 1933.





## Entire Output of United Aircraft Planes

### To Be Taken by Air Transport Company

WITH \$750,000 as the maximum amount involved, the United Aircraft Corp. of Wichita, Kan., formerly the Lark Aircraft Co., announces the closing of a deal whereby its entire output will be sold to the United States Transportation Co. of Kansas City, Omaha, and Los Angeles. The contract calls for at least 50 of the United planes to be delivered within the first year, with the provision that all planes produced thereafter will be purchased by the same concern.

The new plane, devised by F. B. McGee, is now undergoing its first tests. With open cockpit behind the cockpit, dual side-by-side controls, and a cabin with a capacity of four passengers, the plane is considered ideally suited for weathering and instruction purposes. The plane is powered with a Wright Whirlwind engine. The United company is Whitney's newest corporation, being the seventh. The company expects to turn out one plane a week after the plane has been tested thoroughly.

## Lester D. Gardner is Selected to Head Aeronautical Industries, Inc., New York.

ERSONAUTICAL INDUSTRIES, Inc., announces the election as president of Lester D. Gardner, well known owner and producer of Aerovox. Mr. Gardner is director of the Aeronautical Chamber of Commerce and was appointed last year by Secretary Hoover as American delegate to the Fourth International Aviation Congress in Rome. He has been 21,000 miles over European air lines in various trips to Europe to study airway facilities there.



Lester D. Gardner

Mr. Gardner authorized the following statement regarding his plans for the development of Aeronautical Industries: "Our purpose is to provide airplane facilities, air line operations, and others in the industry with from ten to fifteen million dollars in expansion of their companies. Four times as many airplanes will be built this year as in 1932. This means that engines and equipment will have to be produced in proportionately greater amounts. Air bases are increasing every month. Airports, with millions of dollars of service equipment, are being constructed. It is to meet these requirements that a group of experts in aeronautics, engines and management have formed this new company."

"The soundest principles of modern accounting will be followed by the directors. Not only are reports of long enterprises included in the management but a technical advisory board will be available for operators and guidance in construction fields. By spreading the fields of the company over the widest possible range of aviation activities it is felt that a great stimulus can be given this new industry of the future when

expedited investment by the unexperienced might prove a condition of necessity. The complete list of holdings of AERONAUTICAL INDUSTRIES, Inc., will be available for a period at any time by the stockholders."

Recently, the financing of three passenger planes, by a fund founded by a pilot-instructor started a wave of action in the production of passenger traffic that has resulted in unprecedented demand for passenger aircraft. Aeronautical Industries has indicated that leadership by experts is indicated by public interest. Aeronautical Industries, Inc., will enter in the program by a conservative arrangement of the type who have proven themselves to be best.

W. W. Townsend & Co. will carry out the financing in the new company by a public offering in the near future.

## Troy, N. Y., Airport Company is Organized For Flying, Plane Sales, and Airport Work

INCORPORATED UNDER laws of New York, the Troy Airport Co. has been formed at Troy, N. Y., with an authorized capitalization of \$100,000. An airport and flying business will be conducted by the company of which John A. D. and president, E. H. Bush, vice president and general manager, Joseph Goodman, treasurer, and F. A. Brown, secretary.

An excellent field, it is reported, has been obtained near the city limits but little more than five minutes from the post office. It is expected that the airport, called the "Troy Municipal Field," will be completed about the first part of June.

Plans have been completed for a flying school, to be operated, if desired, in conjunction with advance flying classes at Rensselaer Polytechnic Institute, and designed to have in full approval of the government. The chief instructor will be announced shortly.

The corporation will also handle the agencies for the planes, the types as yet unannounced. Scheduled trips to the Rensselaer campus will be a feature of the operation. In summer, and daily excursions to Niagara Falls will probably be made in way before July.

## Insaturation of Los Angeles-San Francisco Service With Fokker F-10 Planes Announced

FOLLOWING THE arrival in Los Angeles of the first Fokker F-10 West applied transportation, the Western Express has announced the inauguration of daily service to the Los Angeles-San Francisco route.

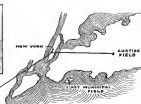
In order to handle this new service at the Los Angeles airport, an entirely new north and south runway has now been laid along the western edge of Van Field and hangars have been erected on the western boundary of the field to house the new equipment. In the future all passenger planes will use the western runway and all mail planes will operate from the old runway on the eastern border of the field.

The new hangars, four in number, are of brick and construction erected on a soil, each hangar having an estimated area of 60 by 80 ft. with a 10 ft. high to be constructed all along the lower or west side of the runway. All doors are of concrete slatted for drainage and a mild ramp surfaced with oil and crushed crushed rock has been constructed across the front of the hangars with a width of 100 ft. and height of 500 ft. Best known, storage space, all mail plane story equipment are all available in the hangar to meet the needs of the new service.

A beautiful passenger depot of Spanish style has been installed in the north of the hangars and planes having to take off will have to be kept. It is of stone and an arched tiled roof construction, measuring approximately 70 by 20 ft. and has a large platform on the roof with a semi-observation tower above that.



HARLEY FIELD



## From airport to city is where time is lost

Most airports are necessarily removed from the heart of the city. This means delay and traffic congestion getting to and from the flying field. Frequently most of the time gained in flying is lost at the beginning or end of the journey. The same applies to mail and express.

Most large cities are situated on water. . . . the ocean, a lake or a river. . . . And that water is usually close to the heart of the city. Rapid transit to airports is well a thing of the distant future and even that will have no drawbacks. The sea is the only clear thoroughfare.

To facilitate the transport of passengers, mail or express, operation of the need of sturdy air lines from airports to the centers of cities. To increase the traffic it is necessary to provide this additional air service. . . . And Amphibians are the only solution.

The Ireland Amphibian is the only ship of its kind in production. A practical sea and land plane that carries exceptional pay loads and provides comfortable passenger facilities for four besides the pilot. . . . either open cockpit or closed cabin.

Fast, efficient, very maneuverable, and safe, the Amphibian affords more adaptability and service than any other plane. . . . Landing is not only greater than in any other type of plane but becomes a walking point in air transport operation.

Ireland Amphibians have been thoroughly tested in service. . . . There is no guess work about what they can do or stand. . . . they are proven aircraft. . . . all the "best" are on. . . . Deliveries are being made with reasonable promptness.

## IRELAND Amphibian

Flies on the air, floats on water, needs no land.

IRELAND AIRCRAFT, Inc.  
Curtiss Field, Garden City, N. Y.



**Italian Flyers Set New Endurance Record**  
Of 58 Hr. 37 Min. in a Savoia-Marchetti  
MAJ. ARTURO FERRINI and COM. P. del Pisto, Italian flyers, landed at Madonna Todi, Rome, on June 2 after a flight of 58 hr. 37 min. duration in a Savoia-Marchetti 8-84 monoplane. The world's endurance record is thus transferred to Italy, since the record of 53 hr. 34 min. 30 sec. established by Edna Stowe Herrick and Capt. George Haddome at a Stinson-Detroit in March 30 has been surpassed by five hours.

The Savoia-Marchetti plane is powered with a 32 cylinder Fiat water cooled engine developing 550 hp. The craft was



Comds. P. del Pisto and Maj. Arturo Ferrini, Italian flyers who established a new world's endurance flight record.

Designed by Alessandro Marchetti, a designer of planes since 1920, Marchetti is at present chief designing engineer for the Savoia company at Santa Colomba, near Milan, which built the record-breaking 8-84.

Maj. Ferrini and Com. Pisto took off at 2:30 A.M., Italian time, May 30 and flew back and forth over a cloud screen in the vicinity of the sea coast. Their fuel pump, the two fliers landed at 3:55 P.M. June 2 after the long two and one-half day flight.

After their official landing the flight in accordance with international aeronautical regulations.

Maj. Ferrini is a pilot at Bari, having flown from Rome to Tokyo in 1929. Com. Pisto was assigned to the Savoia company in 1929.

## French Medal for the Best Work on Aero Engineering is Awarded Edward P. Warner

THE AERO CLUB of France has awarded its medal for the best technical work in aeronautical engineering appearing in 1932 to Edward P. Warner, Assistant Secretary of the Navy Air Association, for his "Airplane Design-Aerodynamics."

This book was published by the McGraw-Hill Book Co., New York, in August of 1932. It concerned aerodynamics treated on the part of aeronautical engineers here and abroad in America in this country, in England, in Germany, in France, and in Italy passed the book. Almost at every college in the country where aerodynamics is taught should the book as a text. In these months the first large printing was completely exhausted and another printing was issued.

Secretary Warner is a member of the Society of Automotive Engineers, Associate Fellow of the Royal Aeronautical Society, and professor of Aeronautical Engineering at Massachusetts Institute of Technology. He was appointed Assistant Secretary of the Navy for Aeronautics in July 1928.

**Capt. Kepner is Credited With Longest Flight in Annual Elimination Balloon Race**  
CAPT. EDMUND KEPNER is considered to be winner of the National Elimination Balloon Race which began from Fort Meigs, Pittsburgh, Pa., on Memorial Day, though official checking of instruments and distances is wanted to be set to rest. Captain Kepner and his wife, Louise W. Kepner, landed at Williams, Va., at 6:30 A.M. May 31 in the first balloon "Army No. 1," the sixth pair to get away in the group of 14 which took off from Meigs Field between 5:01 P.M. and 6:05 P.M. the afternoon before.

Only two other balloons were successful in leaving the earth and which opened up to bring 13 of the balloons to the earth in the vicinity of Pittsburgh. One of these, the "Detroit News," landed at 5 A.M. May 31 at Whitewater, Va., while the "American Business Club of Akron," the other leg, came to earth at Gunter Park Office, Va., some 40 mi. east of Richmond, at 11:55 A.M. May 31. The Detroit News was piloted by William O. Hooley with Russell Whorrett as solo, while the American Business Club of Akron was accompanied by C. A. Palmer with J. W. Hall as solo.

Three balloons were able to be pulled in the United States airway in the Gordon Bennett International Balloon Race scheduled to leave Fort Airport, Detroit, June 30. Balloons and their pilots, which will fly in the thirteenth race, are the "Goodway V," W. T. Van Gosen, the "Gardner B," H. E. Honeywell, the "Glas-Vie Pittsburgh," Sgt. W. Bennett, the "WFF," G. M. Lepidus, the "City of Cleveland," Carl K. Williams, the "Detroit No. 27," E. H. Hall, the "Detroit No. 4," Gordon Bennett, the "Army No. 2," Capt. Edmund H. Kepner, the "Army No. 3," Lt. Paul Ebert, the "Navy No. 1," Lt. J. H. Stevens, and the "Navy No. 3," Lt. W. G. Sells.

Leut. Paul Ebert, pilot of the Army No. 3, and Walter Morton, able to Van Gosen in the Goodway V, were killed when their balloons met the tall tower of the steeple. Van Gosen suffered a fractured left leg, while James P. Cooper, also on the City of Cleveland, was severely shocked and bruised.

The Navy Airplane Los Angeles flew to Bettin Field from its station, N. Y. I., to attend the race. The dirigible returned to its base later without mishap.

## Mahoney Company Builds and Delivers Five Broughams in the Last Five Days of May

FIVE WHIRLWIND Broughams were manufactured and delivered during the last five days of May, according to an announcement from the Mahoney factory in San Diego, Calif., shortly breaking all monthly production records for that organization. During the 35 working days of May, a total of 28 Broughams were made and delivered, it is reported.

These five airplanes landed on the month closed were in Capital Airways of Washington, D. C.; Charles Neff, Tucson, Ariz., the Twentieth Airlines of Santa Cruz, N. D.; Roy Bradford of New Castle, Pa.; and Mission Airline Services of San Antonio, Tex.

## Announce Recent Incorporation of Five New Aeronautical Companies in Nebraska

FIVE AVIATION companies have recently been incorporated in Nebraska, according to a report from Lincoln. These organizations are the Alliance Airways, Inc., Alliance, Neb.; McCook Aircraft Corp., McCook, Neb.; Missouri Valley Airways, Omaha; Central Airways, Inc., Omaha; and Pioneer Aircraft Co., Omaha.

# AVIATION offers another service to its readers

Books on aviation regardless of where published may be obtained through AVIATION'S book department.

THE following books\* were chosen in an effort to compile a somewhat list of the best of modern aeronautical publications:

### AERODYNAMICS

**AERODYNAMICS AND AIRPLANE DESIGN** By Edward P. Warner (1932) 100 pages. \$2.00  
Text on aerodynamics and its application to airplane design. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**APPLIED AERODYNAMICS** By Louis H. Glauert (1929) 100 pages. \$2.00  
Text on aerodynamics and its application to airplane design. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1929 (revised edition).

### AIRCRAFT

**AIRCRAFT BOOK ONE** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK TWO** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK THREE** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK FOUR** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK FIVE** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK SIX** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK SEVEN** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK EIGHT** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK NINE** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK TEN** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK ELEVEN** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK TWELVE** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK THIRTEEN** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT BOOK FOURTEEN** (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**MOOTOR AIRCRAFT** By Victor W. ... (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of motor aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

### ENGINES

**AIRCRAFT ENGINE INSTRUCTIONS** By A. H. ... (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft engines. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**AIRCRAFT POWER PLANTS** By ... (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft power plants. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

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Text on the design, construction, and operation of aircraft power plants. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

**LIFE OF FORTRESS BOOK** By E. V. ... (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

### LAW

**AIRCRAFT AND COMMONS IN WAR** By ... (1932) 100 pages. \$2.00  
Text on the design, construction, and operation of aircraft. Includes chapters on air resistance, lift, and airfoil construction, performance, stability, maneuverability and safety. 1932 (revised edition).

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### Wilmer Stoltz and Miss Earhart Ready

For Atlantic Flight in Pontooned Fokker  
WILMER STOLTZ, Miss Amelia Earhart, and Louis Gutzman are at Tropaeum, N. F., as Aviators go to press, preparing for a flight across the Atlantic. On the morning of June 3, this trio left Boston on their long-range Fokker monoplane "Friendship" and flew to Halifax, N. S. On June 4 the three continued to Tropaeum, where they are now in readiness to strike out across the ocean.

Miss Earhart, who wished to be the first woman to cross the Atlantic by air, has been diving for several years. She



The Fokker monoplane "Friendship" taking off from the water of Boston Harbor

is completely in line with the plan at the start. Louis Gutzman, her ready to act as relief pilot, though he is strong, paying Miss Earhart and Stoltz in the capacity of aviator. England has been indicated as the goal of the flight though it is not that a longer flight will be attempted if the fuel holds out.

The monoplane Friendship is the Westland powered craft which was originally intended as one of the lightest of planes. Commander Byrd was to take in the Antarctic. The plane, which is equipped with pontoons, has been undergoing tests in Boston Harbor for several weeks to determine its fuel consumption, lifting capacity, and so on. Two radio sets have been installed for use during the trans-Atlantic flight.

### Aeronautic Export Report for First Three

Months of 1928 Shows Increase Over 1927  
THE FOLLOWING report recently issued by the Bureau of Foreign and Domestic Commerce was prepared by Freder W. Barker, Transportation Division, Dept. of Commerce.

The increased world-wide interest in American aircraft is evident in the actual orders received by American firms from foreign customers. These orders were received from widely scattered sections of the world including, for example, Peru, Canada, Japan, United Kingdom, Australia, and Cuba.

During the first three months of the current year, aircraft engines, parts and accessories were exported from this country at a value of \$115,485, approximately 150 per cent greater than the value for the first three months of last year, when all such products exported were valued at \$73,434.27. The percentage increase for aircraft alone, which includes both airplanes and seaplanes, was much greater than that of the total value of aeronautical products exported, there being 45 aircraft valued at \$95,610 exported during the first quarter of this year as compared with five units at \$41,570 during the same period of last year.

Peru was the principal market during the first three months under review, when 18 units at a value of \$19,020 were sent to that country, whereas none were shipped there during the same three months of last year. Canada, the receiver of destinations for one unit at a value of \$928 during the

first quarter of 1927, which was sent, obviously, have been of our surplus stock, was the destination for nine aircraft at a value of \$90,670 during the first three months of 1928. It is significant that the average value of the aircraft during the later period approaches \$33,000. Mexico was the third market for the three months under review, when it received nine aircraft valued at \$97,750. Cuba, Brazil and Japan follow in order of their importance with four, three and two units, respectively.

The total value of aircraft parts exported during the first quarter of 1928, was \$287,309, over 100 per cent of the value for the first three months of the previous year when \$93,339 worth were exported. Canada secured the largest amount for an individual market with \$76,539 worth and was followed by Brazil, which was the country of destination for parts valued at \$53,853. Third, United Kingdom follows with \$34,161, and Japan next with \$26,847, indicating its growing interest in aviation. Russia, which was the leading market during the first quarter of 1927, was the fifth market to us previous during the current period. Parts worth the cash aircraft products shipped to non-conquering territories. For to have received these valued at \$735 and Russia at \$747. Canada, Argentina, and the Netherlands were the three leading markets in order of their importance for aircraft engines, the average unit value for all three countries being approximately \$2,690, which indicates that the engines were not of the new production type. One engine valued at \$14,000 was exported to Belgium in contrast to the one to Mexico at a value of \$430. The most value of the aircraft parts were Canada \$19,069, Argentina \$13,315, and the Netherlands \$22,030. France, Sweden, and Germany were the next three biggest engine markets. It is to be noted that there were over 25,000 such parts returned from foreign countries in aircraft engines during the current period than during the same period in 1927.

### Belgians Establish 60 Hr. 7 Min. Duration

Record by Refueling Plane During Flight

BY REFUELING while aloft, Adjutant Crocq and Sergeant Grooten, Belgium Army, completed a duration flight of 60 hr. 7 min. 12 sec. in a two-engine biplane, the Crocq and Grooten. The flight required fuel supply of approximately 170 gal was four times replenished during the flight through a rubber tube of about 30 ft. in length, the fuel being delivered from a plane which flew above that of Crocq and Grooten. Refueling was accomplished each time in about an hour while the plane flew at a 1,500 ft. to 2,000 ft. altitude.

The Belgians took off at 8:45 A. M. June 2 from Tullahoma Airfield, near Brussels, landing again at this field at 6:47:32 P. M. June 4. Reports have been obtained, as we go to press, regarding the type of plane and engine used in the flight.

### Johnson Flies Eaglecock to First Place

In the Twin Cities-Crookston Air Derby

AN EAGLECOCK piloted by "Thunderbolt" Johnson was first place in the Twin Cities-Crookston Air Derby held on the third day of the Northwest Aircraft Show at the World-Class Aviation Field in Minneapolis. Gene Shank in a plane which was owned and Jack Anderson, chief pilot of the Minnesota Aircraft Co., is an Eaglecock, placed third in the derby. The race was started at the St. Paul Municipal Airport by Maj. H. S. Miller, commanding officer of the 10th Air Corps. The 10th Air Corps and the 10th Air Corps were charged there during the Minneapolis and Little Falls, the home town of Col. Charles A. Lindbergh.

## ANOTHER TRIUMPH FOR B. G. SPARK PLUGS



The Curtiss Marine Trophy Race plane, a biplane, in flight over water.

## On the Kingsford-Smith Flight

MAJOR KINGSFORD-SMITH attributed a great part of the success of his trans-Pacific flight to "100% preparation". Only materials of first quality and known reputation were used in his plane. Spark plugs were an item where great care was taken. Kingsford-Smith chose B. G. Mica Hornet Spark Plugs for the job. That his choice was wise is now known by all.

Other recent flights on which B. G. plugs have proven their reliability are the Curtiss Marine Trophy Race won by Major C. A. Lutz of the U. S. Marine Corps, and the endurance and altitude records set by the Navy plane P. N. 12. In the marine race Major Lutz used B. G. Mica Hornet plugs. In the endurance and altitude records set by Lieutenants Soucek and Gavin B. G. IXA plugs were employed.



The "Hornet" (small one)

The B. G. Corporation, 136 West 47th Street, New York City

# B. G. "HORNET" MICA SPARK PLUGS

CHANGE YOUR SPARK PLUGS FOR B. G. MICA



Incorporated in the U. S. Air Corps and U. S. Army Engineers

### Newly Granted Type Certificate Approves Curtiss Robin for 2217 lb. Gross Weight

WORD WAS recently received from the Automobile Branch, Department of Commerce, that the Curtiss Robin has been granted its airworthiness approved type certificate. The plane has been approved to carry 5, or 24, of 111 lb.

Caption: *Fig. 1. The Curves "Robot" showing the plots are and instrument used.*

and as it weighs 1,480 lb empty, the gross weight is 2,217 lb. The Robin, which was described as listed in the May 21 issue of *Aircraft*, is a three cabin monoplane powered with a Curtiss GX-3 engine. The design was engineered by the Curtiss Aeroplane & Motor Co., Garden City, L. I., N. Y. and is being put into production by the Curtiss Robertson Aircraft Mfg. Co. of Annapolis, St. Louis County, Mo.

Output of Aircraft for 1927 is Reported  
To Total 1,962 Planes Worth \$14,250,605

THE DEPARTMENT OF Commerce recently, according to data collected at the National Office of Manufactures, has reported that the stockholders engaged primarily in the manufacture of aircraft in 1937 built 3,863 airplanes, valued at \$22,024,085 and 205 supraplans and amphibians, valued at \$9,338,000. The production in 1935 was 3,225 airplanes, valued at \$7,445,679 and 41 supraplans and amphibians, valued at \$1,610,000. The production in 1936 of 3,460 airplanes, valued at \$10,000,000, and 100 supraplans, supraplans, and amphibians, valued at \$1,840,000, increased from 1,184 valued at \$8,871,022 in 1932, 5,190 valued at \$10,790,000 in 1937, the rates of increase being 84 per cent. for number and 99 per cent. for value.

A similar comparison for 1935 and 1937, based on a total of 798 airplanes, valued at \$6,676,659 in 1935, shows an increase of 143 per cent. in number and 315 per cent. in value.

Of the 41 establishments reporting for 1937, 35 were located in New York, nine each in California and Michigan, four each in Illinois, Missouri, and Ohio, three each in New Jersey and Pennsylvania, two in Maryland, and one each in Colorado, Connecticut, Iowa, Kansas, Nebraska, Virginia, Washington, and Wisconsin.

The statistics for 1927, 1928, and 1929 are presented in the table on the following page. The figures for 1927 and 1928 were computed from data collected at the regular biennial census of manufacturers; those for 1929, from the census made at a special census of aircraft production. The

1957 figures are preliminary and subject to such changes as may be found necessary upon further examination of the returns.

AIRCRAFT STATISTICS FOR THE UNITED STATES  
 1957, 1958 AND 1959

[illegible]

<sup>1</sup> These figures differ from those originally published for this region in the November issue and the inclusion of the first report of late post-monsoon rainfall increased the late monsoon estimate by 1.6%.

† The amount of manufacturing profits can not be calculated from the survey figures for the reason that no data are referred to input.

<sup>†</sup> Includes all compounds in 1970 and 1971.

**Hyannis Airport Corp. to Begin Operations**  
At Its New Cape Cod Flying Field June 15

**THE NEW** Henson Airport Corp. on Cape Cod is reported to begin flying operations June 15. The corporation has a five year lease and purchase option on a tract of land lying between the Barnstable-West Yarmouth Road and the Mary Doug Ranch three-quarters of a mile north of the village. A service 2400 by 1000 ft. has been cleared for operation.

The corporation expects to begin with a Farwell stock exchange and two Boardmen. **Kitty Hawk** treasurer before Robert Ayling is field manager. Allen F. Boardman is president of the corporation, C. L. Ayling, vice president, George C. Boardman, secretary, and George E. Adams, treasurer. All are from Boston or vicinity. Boardman is the president of the airplane factory which builds the Kitty Hawk. He will be chief pilot at Edwards.

Technical Director of Aeronautics Marchi  
Modified Major de Bernardi's Curtiss-Reo

Attention has been informed that the Carlos Rios and used by Ray Morris de Bernard in establishing and using speed record of 318 m.p.h. at Venice is was re-designed by Mr. Castaldi, technical director of Aeromarine, Monaco, an arrangement with N. A. A. signer of the propeller. This is to correct a report and published in our May 28 issue stating that the Rios's propeller was "modified in accordance with designs of Mr. Reed."

# STEEL



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It is because it possesses that quality of "springiness," the steel has become so essential to modern civilization—man is playing an ever-widening part in the development of airplanes and travel by air. More and more steel is being employed in aircraft construction in place of less strong and more expensive materials.

In the building of aircraft, certain of the properties of steel are of especial importance. It has unusual strength in comparison to its weight. Its behavior under stress can be calculated with great precision. Properly designed parts and structures of steel can be trusted to endure under prolonged and often-repeated loads. Steel is not subject to dry rot or similar forms of rapid deterioration. It is strong, tough, lasting, dependable.—T.R.M.

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## Last Minute Briefs

The North American Airways Co. has been organized at Appleton, Wis., with a capital of \$55,000 by E. M. Hagan, F. E. Schmitt, and George H. Schmitt.

Frederick Knack of Ansonia, Conn., Molokai, Ill., aeronautical engineering company, has asked for Europe to study foreign methods of aircraft construction.

That helium is now available commercially has been announced by the Helium Company, Louisville, Ky. This concern has discovered new natural gas fields and has developed an improved method of extraction, which is now in use at Denver, Kan., plant.

Four lectures on aviation are being given each Wednesday night by the Pacific Technological University at San Diego, Calif.

St. Paul, Minn., has been designated as a customs airport, the St. Paul Municipal Airport having been selected by the Treasury Department because of its proximity to the city's regular customs office. This is the second such station, the first being at Key West, Fla.

President Coolidge has signed the bill authorizing the Secretary of the Interior to lease for airport use public lands not in covered 160 acres. The leases would apply for periods not exceeding 20 yrs., subject to renewal.

The aircraft carrier *Lexington*, whose departure tactics hiding recently resulted in the failure of the ship to meet Navy tests, has now been pronounced satisfactory by Secretary Wilson. Tied in shape, the carrier recently maintained a speed of 33.04 knots with full power.

Charles D. Chamberlin has been engaged as consultant to the City of New York on the construction of the municipal airport at Bayside Island. The New York City Government is thereby given the title of aeronautical engineer in the Department of Docks, which is building the new field.

W. N. Moore of Wichita has been elected president of the Southern Airplane Co., succeeding J. H. Taylor, who plans to construct as the Travel Air Flyer Co. of which he was president. Alvin R. Morrison replaces Turner as director.

The Boeing Company has turned out the first of the new Navy patrol planes, the PB-1b, for final testing. Seventy-two others of this type, all powered with Wasp engines, are being built for the Navy.

Announcement has been made that the National Air Transport Co.'s capital is being increased from \$2,000,000 to \$3,000,000. Funds to equip and operate a New York-Chicago passenger line are to be thus provided.

An aeronautical information bureau has been announced by Fred H. Caley, secretary of the Cleveland, O., Automobile Club. Advice and information concerning airplane travel schedules and services will be issued.

Waycross, Inc., of Boston has taken the agency for Stearns plane, and the Bay State Flying Service of that city has been named Motorplane agent.

The West Coast Air Transport has announced that it will place orders for two new Dash 18 passenger, two-engine planes. They are to be put in service between Seattle and Portland, replacing the eight passenger "Cessna" and "C. Lindbergh."

The first Lockheed plane sold by Air Associates, Inc., New York was purchased by the Elizabeth Old Field Service.

W. G. Wardman of MIT was first prize on 650 and 1 Milestone of Harvard the second of \$25 in a recent contest for an airport terminal design sponsored by the Henry A. Institute of Design. A total of 243 plans were submitted.

The Army housing bill has been passed by the Senate. Among the items are: Bolling Field, Washington, D. C., \$177,000; Chanute Field, Ill., \$122,000; Fairchild Air Depot, Ohio, \$103,000; Selfridge Field, Mich., \$100,000.

A recent report states that the Wright Aeronautical Corp. of Paterson, N. J., has purchased part of the American Engine Works, at Paterson, which has been closed for two years. The corporation will not the company to meet the demand for engines.

A report from the New York State Corporation Bureau is. Albany shows that more than a dozen aviation companies received charters in May. All gave indication of substantial business.

As we go to press, late reports appear to indicate that General North came down in the dirigible *Italia* at Cayo Fern in Franz Josef Land. Russian expeditions are being pushed to save the film expedition.

Anthony H. G. Folker is accompanying J. Talbot, president of the Redfield Oil Co. of California, to the West Coast in the two-engine Fokker F-10 monoplane which the Atlantic Aircraft Corp. has built for the oil company. The plane left Teheran Airport, N. A., June 2.

A grand annual dinner will be held at Yale University in October, according to N. L. Zappalovich of the Yale Aeronautical Society. Some 100 students have stated their desire to enter the course, but only 25 will be accepted at the opening of the new class.

Fifteen Chinese students have organized the Chinese Aero League of America in New York City. The president of the group is Dr. Yen Lu-hung, who plans to fly the Pacific that August in his two-engine plane, "The Spirit of China."

Air Transportation, Inc., has been appointed distributor of the Curtiss Robin monoplane in Minnesota, North and South Dakota, and Western Wisconsin.

R. G. Wyant, chief test pilot, is getting the new United Aircraft Corp. plane through its paces at Wickliffe. The new airplane, formerly the Lark, is a four passenger transport plane designed by Fred R. McCauley. It is a Wichita aircraft type of commercial plane.

Three new agencies for the Seafoam planes have been announced. They are Commercial Airways, Inc., Kansas City; Leonard Berberich of Philadelphia for Eastern Pennsylvania; and Harold Harting of Detroit. The Richards contract called for the delivery of 18 planes within the next few months.

# WHO'S WHO

## in American Aeronautics

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Canadian Vickers, Ltd., Montreal, Canada, completes its first "Vigil" Whitehead 24 engine. CANADIAN VICKERS, Ltd., Montreal, Canada, has completed the first Vickers "Vigil," an open cockpit plane powered with a Wright Whitehead engine. It is a development of the Canadian government's policy of an airplane of extremely rugged construction and good performance. These planes are being used for both forest fire and in the Bushy Mountains and as a training plane. It is a very interesting design, especially as the upper wing is of considerably greater span than the lower wing.



Front view of the Vickers "Vigil."

The landing gear attached at the points where the lift struts meet the lower wing. The whole structure, except the upper wing, is of metal, fabric covered. All bearings in drive or steel shafts with no wear used. The undercarriage is of the cantilever type with a wide track. All metal parts are adequately protected against atmospheric influences, and the structure is such that maintenance costs are low.

It has a span of 35 ft. 2 in. and a length of 29 ft. Empty it weighs 1750 lb. and with two people it has a disposable load of 825 lb. making the gross weight 2560 lb. It carries 62.6 gal. of gasoline which should be sufficient for 4.7 hr. at 800 m.p.h. at a cruising speed of 210 m.p.h. The high speed is 330 m.p.h. and landing speed 50 m.p.h. It is stated to have a service ceiling of 15,000 ft.

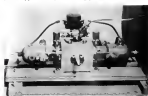
### Concerning 12 Cylinder Fiat A-S 3 Engine Used by de Bernardi in His Record Flight

DATA WAS recently received in this country on the Fiat A-S 3 engine used by Major de Bernardi in his record flight. The engine is a 12 cylinder V type with a bore of 5.66 in. and a stroke of 5.66 in. giving a displacement of 2815 cc. m.

The A-S 3, as the engine has been designated, has its cylinders in two rows with an angle of 60 deg. between them. The cylinders are of forged steel construction, with cast steel water jackets and welded-in seats for spark plug valves, and compression tappets. The pistons are machined in forgings with three compression rings and one of scrap iron. The crankshaft operates in seven bearings, ball, roller metal bearings, with a double thrust bearing in front and allowing the use of either a piston or transfer propeller. The connecting rods are 1 section of rolled-chose steel. In the head of each cylinder are four valves actuated by two overhead camshafts driven from the rear of the crankshaft. The intake manifolds are heated by a valve jacket and the valves are so constructed that they will operate regardless of the position of the engine. Changing spark plug is easy, connected to two magnet magnets driven from the rear of the engine. In addition is a hand cranked to the engine for starting, there is a small auxiliary motor, which is used for priming and injecting a mixture of gasoline. It should 129 lb. per sq. in. into the cylinders on compression.

Edward E. Nelder, Milwaukee, Develops

Two Cycle Engine Burning Gas or Oil  
AN INTERESTING gas or oil burning engine of light weight has been developed by Edward E. Nelder of Milwaukee. It is a two cycle design designed to weigh only 60 lb. and to develop 500 hp. at 3500 r.p.m. It is a four cylinder type with very few moving parts. Rather than have



The gas and oil burning engine developed by Edward E. Nelder

the piston connected to the crankshaft, there is a bearing around the connecting rod separating the piston from the crankshaft and on this space compression takes place. The connecting rods are connected to the crankshaft through a Scotch link mechanism. A two cylinder model has been completed. It weighs 35 lb. and develops 12 hp.

### N.A.T. Makes Toledo a Regular Stop and Inaugurates Shuttle Service to Detroit

TOLEDO, O., is now a regular stop on the National Air Transport, Inc., air mail and air express line between New York and Chicago, according to statement by Col. Paul Henderson, vice president and general manager of the company. A shuttle plane service also has been started between Toledo and Detroit to serve the latter city.

Toledo is the only city to have a stop on the eastern half of the transcontinental air mail line between New York and Chicago except Cleveland which has been a terminal point since the service was inaugurated by the Government. A schedule announced by Colonel Henderson for the Toledo stop are as follows:

Without exception from New York arrives at Toledo at 1:45 A.M. and leaves at 2:20 A.M. for Chicago. The connecting shuttle plane leaves Toledo at 4:05 A.M. and arrives at Detroit at 5:30 A.M. or plenty of time for an early start to insure first delivery and match the speed of telephone right letters.

Without exception shuttle plane leaves Detroit at 10:00 P.M. arrives at Toledo at 11:00 P.M. to connect with the method through plane from Chicago which arrives at Toledo at 11:15 P.M. and leaves at 11:30 P.M. to arrive in New York at 6:15 A.M. the next morning.

The day planes of National Air Transport on the New York-Chicago run also stop at Toledo, scheduled at 10:45 A.M. and scheduled at 5:15 P.M. but they do not connect with the shuttle service between Toledo and Detroit.

The type plane used on the shuttle service between Toledo and Detroit is the Potters Macgregor which is the same type plane now in use on the New York-Atlantic night air mail line on the New York-Boston, and other air mail lines.



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## AIR ASSOCIATES, Inc.







been delivered to Western Air Express for operation between Los Angeles and New Francisco. During performance trials it was shown that the high speed of the 3-16 with its tail gear load was a fraction less than 150 m.p.h. Again, it would seem that the single row radial Whop is not precluded the high speed of the weight-carrying planes.

The single row air cooled radial continues to dominate conventional engines, both basic and advanced. This type of engine in the simplest is form, most accessible, easiest to install, and has thoroughly demonstrated its extreme dependability in all sizes. Because of the above qualities, it necessarily follows that its manufacturing cost and sales price is lower, as well as the fact that lower maintenance expense as compared to any other type of engine may be expected.

## The Bellanca Sesquiplane

*Continued from page 1675*

over, to protect it against excessive compression loads caused by landing, it has another streamline tube slipped over it and welded in place at the ends. The tubes are concentric, with the outer tube not quite so long as the inner one. Exceptionally heavy tie-rods are used to carry part of the loads in these struts to the fuselage. There is a double set of lift wires between the upper and of this forward strut and the forward wing fitting at the fuselage end of the lower wing panel. One of the two lift wires from the upper end of the rear strut goes to this same fitting on the forward span, while the other wire goes to the corresponding fitting on the rear span. The landing wires are single and lie in the plane of their respective spans.

The landing wheels are each supported by two steel tube members, both on the inner side of the wheel. The forward member is almost vertical, being bent slightly to lean the wheel further forward. This member is connected between the shock absorber mechanism, in the forward span, to the strut point. The rear member is mounted to a ball and socket joint on the rear spar at the rear strut point. In front view, these two members are vertical and are prevented from rotation by two heavy tubes, one on each side, mounted before the point of support providing a strong moment of the struts. The forward member has almost a vertical track, while the wheel rotating about the rear support in the narrowest point. This entire mechanism is contained inside the wheel, to provide for the travel of the shock absorber, which is only three inches, there is a small bump on the upper surface of the wing caused by the dashpots facing into the mechanism. The shock absorber consists of approximately 45 turns of  $\frac{1}{8}$  in. rubber shock chord. Steel cables are attached to the axle of the landing gear, on each side of the wheel, to draw the wheel into the wing and bring it into position for the landing gear, the landing tube mentioned above, preventing side motion (providing the fixing moment at the point of support) is drawn back towards the trailing edge and the cable pulls the wheel upward into the nose in the wing. The landing tube is then kept open as long as wheel is retracted.

To lower the landing gear, the reverse is carried out with a cable on the outer side of the wheel drawing the wheel down, the bracing tube being released by an instantaneous action locks the wheel for landing. It moves parallel to the chord of the wing and has an independent spring and shock absorber chord attached to it to draw it into place. When in place it is locked by a short rod connected to an

shutter visible from the cockpit. The lock is controlled by a foot pedal on the cockpit as in the action of the landing gear. It catches drawing up the wheels are wound on a cable between the pulley arms on the cockpit. To one side of the drum is attached a dog actuated by a lever. There is a cable which on the handle of the lever, one for raising the wheel and the other for lowering down. Thus, to retract a wheel the landing gear, a foot pedal is pressed to draw it; to lower down landing the supporting tube is pulled. The supporting tube is then drawn back by the action of a cable foot pedal providing the wheels to be moved by using the hand lever. When the wheels are in place the dog device is visible from the cockpit. It consists of a solid colored red project up from the leading edge of



Showing construction of the retracting lever wing on the sesquiplane. Note the forward fitting at the top.

Time The time required to fold the wheels is said to be between 27 and 35 sec. and to unfold, from 7 to 9 sec.—a total cycle taking 24 to 30 sec.

According to N. V. Hilschard, structural engineer at the Bellanca Aircraft Corp. who worked out most of this landing gear, the combined weight of the retraction and landing gear is not greater than the weight of the side struts which it has eliminated by making the landing gear a full member. The longest member is only 34 in. and according to Hilschard from the total weight of the retractable chassis this is as that of any conventional design. The value of a retractable chassis for a long flight is apparent; Hilschard says that only 10 per cent of total resistance is shown by the retraction although 20 per cent of the total resistance is added to the landing chassis as Army Air Service results. It means that 10 per cent of the power would be saved if the gear is 11 times 100 hp. and consuming 10 and 200 lb. or hp. this means an extra load of 20 tons 50, or 60 lb. A number of retractable landing gear mechanisms

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have been made since the war, but it is believed that this is the first commercial design to show the wheels completely out of the fuselage. It will be recalled that A. V. Verville, then of the Army Air Service, designed a remarkable landing gear used on the Verville E-3 racer in the 1922 Pulitzer Races. It is understood that the maximum speed of this plane with the landing gear out was 162.6 m.p.h., while the maximum speed with the gear retracted was 181.1 m.p.h., a difference of 18.5 m.p.h.

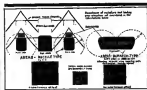
Mounted at the outer end of the lower panel is the auxiliary wing. It meets the lower wing panel at a sharp angle and is hinged into it by short struts. As has been mentioned before, it has a double taper and follows usual wing construction, with two spars converging at a point about five feet from the wing. From here the wing is replaced by two secondary struts attached to the main wing, one to each spar. The auxiliary wing beams are non-rotated sections, and in spite of the fact that the wing has its greatest thickness at the root, the beams increase in thickness toward the upper end, where they meet. This point is badly stressed and the beams are reinforced with gusset plates. The struts conforming to the upper wing are faced with balsa wood; the ribs are steel to brace these struts. It has been stated that the lifting capacity of this strut permits it to be constructed with an incomparably high safety factor which provides a positive support to the upper panel.

The fuselage resembles those of most other Bellanca models; it retains the lanceolate section so pronounced in the Columbus. In fact, the fuselage is almost identical to that of the Columbus except that it is considerably elongated while width and depth are just proportionately enlarged. The overall length of the plane is 29 ft. Its construction is similar to the other Bellanca planes except for a few refinements in

details. It is constructed in two units joined at a joint in the longspan just behind the cabin; this is intended to facilitate handling and shipping. Chassis rails, which are made of steel throughout, run the rear section in forward and backward, while the forward section has a modified Verville type in the side panels, and the ends hinging in the top rail beams in panels only. Landing there is in a hinged (cross) beam in place of fixed spar attachment. Plywood strips, built to play like members approximately one inch square, are used to support the fuselage frames. The longspan is double longitudinal tubes at the sides, and the center section members, between the upper wings, are round tubes. The forward spar members of the center section consists of a large round tube while the rear spar member is of the T type. It consists of a T-section tube on bottom and a one inch tube on top, with five one inch tubes for extra strength, then is welded to the rear-point of the lower member and is at ends of the upper member. The members across the fuselage supporting floor are of aluminum section replacing the aluminum steel box, formerly used by Bellanca. These cross beams have heavy gussets at the joints, as there are no cross bracing except one member to strengthen the interior of the tube. In addition to the side gussets, at the rear spar of the outer section there is a large triangular web welded on each corner of the joint. It consists of a flat sheet of steel with two ribs welded to the fuselage frame and the third web reinforced in a narrow flange welded on plates.

The fuselage is divided into two compartments by the large 500 gal. gasoline tank on the center of gravity under the main wing. In front of this tank is the pilot's cockpit while behind in the large compartment for the navigator and radio operator. The rear compartment is rectangular in shape, 7 ft. high 4 ft. 8 in. wide, and 6 ft. high. It is deep enough for a

# DESIGN



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During the fitting for the tail skid, and the inspection spring in fastings. The wheel shown belongs to a "Dolly".

path removed for inspection of the tail of the plane or to make adjustments of the Poussy north indicator compass. Near the ceiling, at one side of this panel, is a small instrument board fitted with the north indicator compass, controller and indicator wheel, mounted on the rear beam at the center section, at the front of the compartment, above the fuel tank, is a Poussy magnetic compass. Below this and mounted on the rear of the main fuel tank is a sliding table for maps, charts, etc. The radio apparatus is on the right of the cabin. At the rear of this writing, only the DeLauriers wheel driven motor unit has been installed, though it is understood that both a transmitting and receiving set will be provided. The radio program, which is fitted with an adjustable probe. Mounts, respectively, is mounted on two struts hinged to one of the vertical members of the fuselage frame alongside the cabin in the right wall of the fuselage. A third member hinged to the gusset is slung to one of the horizontal members above the window. The unit is mounted in such a way that when it is not in use it can be taken out of the entrance and then return the air resistance. This is done by releasing the clamp on the weak attached to the horizontal member of the window frame and swinging the unit through the window, into the fuselage. The unit is then, clamped by another fitting on one of the bearing tubes inside the fuselage, thus locking the gusset in place. Cables are carried inside of the struts to the radio apparatus. The entire plane is then loaded to provide a ground for radio communication.

Entrance to the cockpit is through one of the large sliding doors—on either side of the fuselage. The planes are of

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Aerob. area ..... 14 sq. ft.  
Stability area ..... 14 sq. ft.  
Rudder area ..... 4 sq. ft.  
Fin area ..... 4 sq. ft.  
Weight empty ..... 845 lb.  
Useful load ..... 550 lb.  
Adverse area ..... 14 sq. ft.  
High speed ..... 120 mph.  
Low speed ..... 30 mph.  
Cruising speed ..... 110 mph.  
Climb ..... 300 ft./min.  
Cruising range ..... 2,000 mi.  
Power plant ..... 100 hp.  
Fuel consumption ..... 7 gal. per hr.  
Oil consumption ..... 2 1/2 gal. per hr.

## The Boeing B-1D Flying Boat

Continued from page 2667

ward spars, are braced laterally by a horizontal tube between them.

The engine is mounted on a trans of round steel tubes welded together. The mount consists of two tubular rings with tubes bracing them fore and aft. The rear ring, in which the engine is bolted, is supported by the rear main strut, by two members extending to the forward spar (fitting of the lower wing on each side of the hull), and by an oil-damped member extending to the forward spar fitting at the center of the upper wing. The rear ring of the mount is braced to this spar through the forward spars of the upper wing as shown. In the mount, which is secured out with short chains to form a streamlined nacelle, is a five-gallon oil tank. Overline is carried in tanks installed at the upper wing.

### Hull of Simple Design

The hull is of simple design, having clean lines intended to produce easy gliding as the water combined with minimum aerodynamic efficiency. The sides and rear deck are flat, while the bottom has a straight V with a single step just under the wing. Behind the step, the angle of the V is increased until the bottom is almost flat over the tail. The forward deck also has a slightly convex V as far back as the windshield to break of the cockpit. The end of the sides is flat and the depth of the sides decreases gradually toward the rear to provide proper clearance for the 8 ft. 6 in. propeller. The hull is constructed of two ply aluminum plating built on a frame structure of oak, ash, and spruce.

Passenger and pilot are carried in a glass enclosed cabin arranged with comfortably upholstered seats easily accessible through three hatches. The entrance of the cabin is lined with fabric, of pleasing color, to harmonize with the mahogany finish of the wood. A dome light is provided and also an exhaust heater. The windows of the cabin are of shatterproof safety glass. They can be opened or closed by a convenient crank. Their size and location permit very good vision, a desirable feature for passenger work. There are five hatches in the roof of the cabin and a third leading to baggage and equipment in the rear.

The fixed tail surfaces are constructed of wood, while the movable surfaces are of welded steel tubing. All are fabric-covered. The horizontal stabilizer has been re-designed with

adjustable in flight to compensate for any differences in shape, as to varying loads. It is supported at the elevator hinge in two struts to each side of the hull. The leading edges are lowered to make the setting adjustable. The adjustment mechanism is contained in the vertical fin, which is set below the stabilizer and built as an integral part



on view of the new Boeing B-1D flying boat (Whitcomb).

of the hull. Both elevator and stabilizer are of the horn-bellows type, while ailerons are subintegrated, extending out to the wing tip. All control surfaces are actuated by cables.

The principal characteristics of the Whitcomb model, as stipulated by the specification, are as follows:

Length ..... 30 ft. 8 in.	Height ..... 12 ft.
Wing area ..... 216 sq. ft.	Adverse area ..... 14 sq. ft.
Stability area ..... 14 sq. ft.	Rudder area ..... 4 sq. ft.
Fin area ..... 4 sq. ft.	Weight empty ..... 845 lb.
Useful load ..... 550 lb.	Adverse area ..... 14 sq. ft.
High speed ..... 120 mph.	Low speed ..... 30 mph.
Cruising speed ..... 110 mph.	Climb ..... 300 ft./min.
Cruising range ..... 2,000 mi.	Power plant ..... 100 hp.
Fuel consumption ..... 7 gal. per hr.	Oil consumption ..... 2 1/2 gal. per hr.

## Fuselage Analysis

Continued from page 2676

Mounts of Wing Brackets

High Inertia—Left and Right Ends on the Fuselage

	Force	Moment	Force	Moment
Left Inertia	331	13.8	4585	
Right Inertia	331	13.8	4585	
Left Inertia	331	13.8	4585	
Right Inertia	331	13.8	4585	
Left Inertia	331	13.8	4585	
Right Inertia	331	13.8	4585	
Left Inertia	331	13.8	4585	
Right Inertia	331	13.8	4585	

Force (wing up and back) are positive.  
Moments wing measured above and forward of C.G. are positive.

If the corrections for sign just indicated is followed it will be found that counter-clockwise moments will come out

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negative and clockwise moments positive. Our lift force acts upward and are therefore positive. These wing lift the wing of the C.G. has a positive arm and gives a positive clockwise moment. The lift due to the front spar is also a lift. The other lift acts behind the C.G., hence negative arm, and causes a counter-clockwise or negative moment. In fact, the wing lift due to the wing always acts forward of the C.G. and therefore negative. If however it is assumed above the C.G. and has a positive arm. The moment is then negative. In front spar is pulling forward and its force is then negative. However its arm is below the C.G. and is also negative. The negative when multiplied gives a positive and therefore is moment due to the drag of the front spar is positive. This parallel stress are used, as in other cases, they have a drag component and so only apply a lift force on the fuselage. In this case however the drag load due to the spar is not greater than in our case.

From the table above the following totals may be obtained:  
Sum of vertical or lift forces = 5544 lb  
Sum of horizontal or drag forces = 10574 lb  
Sum of moments = 26,255 in. lb

We know that the moments of our panel loads are not that they have no horizontal component since they are an average vertically downward, and therefore vertical sum is 100 lb. It is evident therefore that the panel loads must be at least the loads due to the wing reactions. It is therefore necessary to apply a thrust load and a tail load to the fuselage to bring the system into equilibrium. This may be done by writing down and solving the three equations of equilibrium. Thus in connection V, H, and M all equal to zero. In writing these equations it will be noted that all of the wing forces are multiplied by a factor K. This is a correction factor which brings the wing reactions to more nearly for true values. The value of K will vary anywhere between 1 and 1.15 for different planes.

The equations of equilibrium are:  
Reaction V: 4564K = 4463 + H = 0  
Reaction H: T = 10574K = 0  
Reaction M: -997 = 244.3H = 26,163K = 0

It is particularly important that the proper sign be set in the above equations. If the load on the fuselage is acting upward, and T, the thrust on the nose, is assumed acting backward. These are the positive directions and therefore H and T in the connection V and H equations are positive. If in the last relation other signs were used, the index of it setting in the opposite direction to that required. In the moment M reaction the arm of T is assumed downward and that of H backward from the C.G. or are therefore negative thus giving a negative moment to these two forces. The wing reactions are listed with the same sign as in the case above.

Solving the reactions of equilibrium:  
H = 4463 / 6564K  
T = 10574K

Substituting for H and T in Reaction M we get:  
-997 = 244.3(4463) - 244.3(10574) = 26,163K = 0  
K = 1.074333 / 26,163 = .0406  
H = 4463 / 6564 = .680  
T = 10574 / 6564 = 1.61

T is distributed between the upper and lower longerons in inverse as its distance from each. In our plane and at 0.5 tail moment this places half the load on each longeron. The lower longeron will take 10574 / 2 = 5287 lb. The fact that T is acting back is often misleading but since the drag load in back reactions are action forward it is convenient for T to act back to maintain equilibrium.

The wing reactions must also be corrected by multiplying K. K is a very small correction factor and it is almost impossible to show exactly. In the writing angle make it almost impossible to show exactly. In the writing angle make it almost impossible to show exactly.

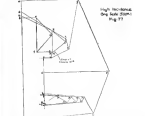
The wing reactions must also be corrected by multiplying K. K is a very small correction factor and it is almost impossible to show exactly. In the writing angle make it almost impossible to show exactly.

### Corrected Wing Reactions

Point	Wing Magnitude	K Corrected Force	Point Force
Front spar	Left 321	994	328
Drag	-383	594	-341
Rear spar	Left 154	994	155
Drag	0	594	0
Front strut	Left 413	654	419
Drag	-345	994	-347
Rear strut	Left 1947	994	1956
Drag	476	204	908

We now have all the loads that are acting on the fuselage and they are in equilibrium. We are therefore ready to start the structural analysis of the frame. The loads are applied at their panel points as in Fig. 77.

It will be noted in Fig. 77 that the wing loads, the thrust load, and the tail load, have all been placed at their proper



panel point and added or subtracted from the panel load at that point. When the loads are acting down they are added to the panel loads which also act down and when the loads act up they are subtracted from the panel loads.

In constructing the stress polygons, the corrected force polygons are constructed first. The force polygons are bounded by the lines a-b-c-d-e-f-g-h-i-j-k-l-m-n-o-p-q-r-s-t-u-v-w-x-y-z-a. When it comes exactly we are certain that connection V and H of our force polygons are in equilibrium. However, even without such connection M and for that reason we must be very careful in solving the equations of equilibrium. If we wished to check connection M before equilibrium.

With accurate work the diagram should very nearly close. It is a very small correction factor and it is almost impossible to show exactly. In the writing angle make it almost impossible to show exactly. In the writing angle make it almost impossible to show exactly.



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## SIDE SLIPS

By ROBERT R. OSBORN

A technical magazine published in one of the eastern cities yesterday carried an article on aerodynamics, which was followed by the following explanation, taken from the article, but it is missing typographical errors in it, which make the definition of "side-slip" rather more graphic than the author intended. "Side-slip is the sliding of air on top of the wing which causes dangerous loss of lift after the leading point is reached." If it had only been written "slipping" in the definition of the student who stole for the first time—the description would have been perfect.

Mr. E. D. M., who is an air regular staff of Aviation, takes out attention to a new paper description of a new side-slip plane, which states: "The plane is known as a new plane because of its peculiar wing construction."

What do you make of that, Watson?

New side-slip plane is getting to be less successful than it used to be, the editors were to be adding their own comments to give it up as a job. Mr. E. D. M. is a member of a club with a name—E. D. M. is a member of the Esline Club. No one was hurt in the forced landing on the 10th, turning out just as a landing lesson by adding the last line, "Some people like to be a good thing along, don't they?"

The new side-slip is an attempt to break the world's endurance record for airplanes, which failed because of engine trouble, and at the end of the paragraph is the note "Palm was used to tell more people than better."

A recent issue of Popular Mechanics contained the first picture of a tail gun as we have ever seen, the photo for the Aviation column in this issue being E. K. J. of Pittsburgh, Penn. The picture shows a plane flying downward, and first, and opening. The caption is "Flying Gun of the Clouds at Hampton Trail Street, Aviators Have Gun to Death Because of Trust in Their Gun."

Truly, though, it takes only a little longer around the hangar and flying field office to learn the average student who believes his name at all.

As the editorials seem to be writing the column for us this week we might as well finish with a letter which L. D. received from a friend, and reprinted as is. The letter contains a description of a new baby brother, recently arrived in the family, and as the writer is only 15 yr. old, it furnishes additional proof that the coming generation will take aviation for granted, and that they already know more about it than the older generation.

"Of course, I know, but I don't know long service; only a two-hour test powerful, most kind of area but superior. Especially with a loud speaker of such proportion but, even capable of spinning great distances, and with only a two-foot landing gear. Still, I don't know to perfection as yet, but I am not too heavy, but already generous, and I am not too heavy, but already generous, and I am not too heavy, but already generous. The designers claim the three feet in stability can be a better outcome in the next two years. They are that confident of its stability quality that they never as that when it is fully developed, and of need to the Army Air Corps it will be promptly accepted."

## AIRPORTS AND AIRWAYS

### Chicago, Ill.

The air mail business crashed here in the last year and is expected to double again before this year ends. Engineers on planes now order and leave Chicago every day and are expected to leave additional planes will begin flights between here and St. Louis, Mo. These planes now carry a daily average of 5,000 lbs. of mail and from Chicago, this is the only route of express. In April the air mail amounted to 1,200 lbs., as compared with 1,200 lbs. in April, 1927.

Later service between Chicago and St. Louis is to be made by the Robertson Aircraft Corp. on August 1, according to recent announcement. The schedule calls for a five-hour flight with stops at Peoria and Springfield.

A Travel Air three plane airplane, powered with a Curtiss 225 engine, has been purchased by the United States government, for the 1928 Observation Squadron, Marine National Guard, for their own use as a training plane. The plane will be sent on order and leave in July.

Aviation engineering trips over the city are growing in popularity. On a recent Sunday 355 passengers were carried by the various concerns now operating this service. Edward F. Soltau, William Bruck, and Henry McDonald, bought their "Palm of Detroit" from Detroit recently.

Andrews, however, never went over and known as the first woman in the world to do so. She was successful, did it before the "Woman in Aviation," at the Women's World for, held last today. She has not been flying 30 yr., was at which she spent fighting a winning battle against pneumonia at Santa Fe, her present home.

The Southern Aviation Club has been organized with C. F. Butler, 30136 Florida Street, as president. A building is now under construction at 30136 South Florida Street, where agents of other equipment for ground work have been installed. A new airplane will be bought later.

Andrews changed with the design of the Chicago's great field, May 1923, recently took an airplane trip over the proposed location of the grounds, to get a notion of the place they will have to solve.

### San Francisco

What is claimed to be the largest, high-altitude international balloon ride in the history of the world will take place in the Nevada Mountains. It is 28 mi. northeast of Cedar, Calif., and about 50 mi. west of Reno. The field was taken by G. C. and W. T. Miller, brothers, who are army aviation engineers for the Department of Commerce. The design was made last fall. The ride was first proposed by "Red" Lonsdale, former Army and now plane pilot, when the present was flying the mail.

The mail is a four-engine four approximately eight miles long and one and a half wide. A north-west runway 5000 ft. long, and an east-west one 3000 are in use now. Both the landing tracks are 600 ft. wide. With some more work it is possible to have a runway length-wise of the field. Boundary lights have been placed on towers 10 ft. to show the snow in the winter time.

In preparing data for a birthday celebration in honor of the completion of the first year of transcontinental air mail service by the Boeing Air Transport, Inc., the Boeing field manager, E. H. Rogers, and field clerk, Ray E. Mason, had that on July 27, 1927, 120 tickets had been sold to air travelers,

originating in their territory. Of this number two were saved, leaving an actual total of 118. The points these saved passengers flew to and their number are as follows: To San Francisco 89, to Sacramento 27, to Elko 3, to Salt Lake 7, to Omaha 1, to Chicago 8. These all traveled by regular mail planes. Recently a Beech business man with repetitive symptoms is to be closed in San Francisco, having raised his train, chartered a special plane at the cost of \$600, to get to the city. And the Boeing company got him there on time and then some.

The above passenger fares total \$4,000 or about \$500 average passenger business monthly.

### Detroit, Mich.

By John T. Reed

Detroit headquarters of Ray Wing Leach, Inc., recently announced that the company's lightning service over Niagara Falls was starting with Ford monoplane C-1477, the same plane in which Henry J. Bruce piloted Mr. Evans' flight from Detroit to Niagara City and which later was used to transport the Bremer from Great Island to New York City. The plane recently left Ford Airport for Niagara Falls with 12 passengers, including the captain of the American and Canadian office of Niagara Falls, Maj. John W. Leach, former Canadian Army pilot, in chief pilot of the company.

The Detroit Board of Commerce, the U. S. Department of Commerce, and several Franco-American organizations of the city, recently were hosts to the French Aeromarine Mission to America, when that distinguished group of Frenchmen visited Detroit.

The commission, headed by General Paul Blanchard, arrived here in two Detroit-made airplanes, a Ford bi-engine monoplane and a Ford tri-engine, and remained here for five days, a longer period than their stay in any other American city they had visited thus far.

While here, members of the commission visited the Ford, Buick, and Stinson plants and paid a visit to the General Motors proving grounds, near Milford, Mich.

Ben Hadley, president of the Pacific Aero Motor Corp. of Los Angeles was a recent visitor at the Ford Airport. Hadley flew in from Wichita, Kan., piloting a newly purchased Stinson Warhawk biplane.

Another Stinson plane was at Ford Airport recently piloted by Crocker Ross, secretary of Reynolds, Inc., of Boston, New England Stinson distributor. Ross was flying the plane in from Wichita.

### Schiller and Danforth Speak

Edward F. Schiller and Ed. Charles H. Danforth, commanding officer of Billings Field, were recent speakers at the Detroit Flying Club.

A group of prominent Detroit women recently announced the formation of the Women's Aeronautical Association, the purpose of which organization is to promote aviation. Membership in the association is limited to women who actually have promoted the cause of aviation, or the wives of men directly interested in aviation, or either physically or financially able.

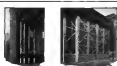
After incorporation papers have just been received, the organization was formed shortly after the close of the All-American Aircraft Show here. Mrs. Orin Field Haddock,

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Seattle: Federal Building, Los Angeles: Chamber of Commerce,  
The Pacific Company of California, San Francisco: San Francisco  
The Pacific Company of California, San Francisco: San Francisco

These Cessna-Trener biplanes will be certified shortly, and  
seems should soon be in operation.

It is also officially announced that during the dedication of  
the airport in August, there will be a general assemblage of  
Army planes at the airport.

Charles Galey, chief mechanic of the Northern Army,  
and building government mechanic's license, has submitted  
three hours of instruction on a Waco 38. He was last over  
10 in of only work, and will soon qualify for his limited commercial license.

### Los Angeles, Calif.

By Charles F. McFarland

Once the successful military flight across the Atlantic of  
the German Junkers Heinkel, large crowds have been col-  
lecting daily at Dyers Airport, Los Angeles, for a view of  
the all metal fighters plane in exhibition there. Although  
this plane is approximately eight years old, being one of the  
first of the original German Junkers type to be brought to  
this country, it is quite similar to the Heinkel in general  
characteristics. This plane contains the original BMW 320



Harvey Crawford's early model Junkers in use at Dyer Air-  
port.

hp. engine while the Heinkel used the EL 280 hp. engine.  
This plane, which is the property of Harvey Crawford, is  
still in excellent condition and is much in demand for rec-  
reation purposes. The property of his passengers and the  
plane at a maximum speed of 135 m.p.h. has made it a popu-  
lar transport plane at Dyer Airport.

Spring semester at Dyer Airport is largely centering around  
the rebuilding and installation of OX-5 engines. Fifteen of  
these engines and a generous supply of replacement parts  
are on hand, and due to the excellent use of the engine for  
the past five years Dyer has developed materials and meth-  
ods making it possible to develop this engine from 80 to 135  
hp. with a decrease in operating costs.

### Oakland, Calif.

By James MacKinnon

The Mutual Aircraft Co. is the latest organization to re-  
organize regular daily aerial passenger service between the  
Bay district and Los Angeles. The northern terminal is lo-  
cated at the Oakland field. The first plane recently took off  
from the local field for the coast.

The University of California announces that students at  
the Los Angeles branch of the institution have formed an  
organization known as the Student Aero Club. This club  
has organized a company to interest college men in aviation  
and is anticipating an inter-collegiate airplane meet to be  
held at Los Angeles next September.

The rapidity with which the Oakland Airport is growing,  
is surprising everyone. During the year showed 200  
landings and takeoffs of \$125.35. In the four months since  
landings have about tripled to 6000 and earnings have more  
than doubled to show a figure of \$9444.27.

The following figures tell the story:

1937	LANDINGS	PASSENGERS	REVENUE
November .....	2022	754	\$ 256.58

December .....	2062	799	\$65.96
1937			
January .....	2475	1386	1133.39
February .....	2807	2032	1893.90
March .....	4646	3379	3246.73
April .....	6946	4514	3944.17

Mail arriving from Vancouver, Seattle and other northern  
points which has hitherto been sent to San Francisco for dis-  
tribution although intended for local residents is now to be  
assigned direct to the Oakland Post Office. This enables  
local Bay residents to receive such mail the same day as  
received at the airport, saving a day in distribution formerly  
required due to the double handling.

### Long Beach, Calif.

An airplane business deal has recently been conducted  
between Southern California by the Long Beach, Calif.,  
Chamber of Commerce. The purpose of this deal is to estab-  
lish the Pacific Southwest Exposition opening at Long  
Beach on July 27. The theme of this exposition is to be  
the great exhibit of aircraft and models and accessories of  
all sorts pertaining to aviation.

### Seattle, Wash.

By M. C. Conel

W. H. Boeing and Phil H. Johnson, president of the Boe-  
ing Airplane Co., Seattle, have left Boeing Field for Chi-  
cago as one of the Transcontinental which has been in the  
country a short time. The plane has a new Horant engine.  
From Chicago Boeing and Johnson will proceed east on a  
business trip.

With the idea of preserving the archives of the Univer-  
sity of Washington the winning letter in Seattle's recent  
round-the-world air mail derby, members of the Alumnus As-  
sociation are planning to collect all private letters for it.  
The letter, returned to Seattle recently after being flown  
as mail, routes agreed the world, will be sold at auction at  
the Elmer W. Wall House to be held June 15.

M. L. Spenson, president of the university, and other col-  
lege officials are urging the purchase of the letter letter  
for the university museum. Alumnus are to make a pool bid  
for the letter.

With the aim of making there an airline business deal in  
instead of air mail between Seattle and points East, the Van-  
couver Air Lines are contemplating a direct air mail connection  
between these sections, according to an announcement made  
by Claude V. O'Donoghue, traffic manager of the company.  
The proposal under way, Mr. O'Donoghue said, was for ex-  
tension of the Vancou Airline from Pecos to Seattle, via  
the Colorado River and Portland.

With the view of putting Ellensburg, Wash., on the air mail  
map, three members of the Ellensburg Chamber of Commerce  
visited Seattle recently to inspect the airport and arrange for  
the purchase of a plane to be used as an air taxi between  
Ellensburg and neighboring cities.

The special committee stated that an option had been taken  
on a 169 acre tract at Ellensburg, to be developed as an air-  
port. If L. Anderson, Radio Reynolds, and Lawrence Gar-  
ber accepted the special committee.

Seattle Airways has announced the arrival of a new Lan-  
caster plane, shipped by express from the factory in  
Seattle, Wash. The craft will be used for instruction and  
promoter work.

### Yakima, Wash.

The new airport for Yakima was dedicated on June 1, and  
the ceremonies were held with the opening of the airplane  
service between Yakima and Portland, which has been pos-  
sible from May 25 to give time for the finishing touches  
required by the field. Officials of the Yakima Chamber of  
Commerce were in charge of the dedication, and a group of

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Southland Jobbing House  
Norfolk, Va.

prominent Portland business men joined in the program. Air buses and other stunts were held and \$1000 in prizes and trophy cups awarded.

The celebration began at 7 A. M., when the first plane in the Yakima-Burlington service took off from the new field. It continued through the day, closing with a ball at the Yakima Armory, with visiting across the points of honor.

A feature of the day was the dedication of the plane "Yakima", one of those to be used in the new service. Chief Nash Salomon of the Yakima Indians christened the plane.

## Hawthorne Heights, N. J.

Leading here recently the French Mission for the Development of Aeronautics visited the plant of the Atlantic Aircraft Corp. The distinguished guests were first met by Charles L. Lawrence, president of the Wright Aeronautical Corp., and they went through over the airport and factory by Major Geoffrey Spence, president of the Fokker Aircraft Corp., Anthony H. G. Fokker, designer of the planes which bore his name, and R. B. C. Nieuwenhuis, assistant to the president of the Atlantic Aircraft Corp. and vice president and general manager of the Teterboro Airport, Inc.

The guests shared interest in the performance of a Fokker Super Universal piloted by G. E. Hagren. Interest was also shown in a new Fokker F-33 biengine plane nearing completion in the factory. This plane is being built for J. A. Fokker, president of the Bredafield Oil Co. of California.

Following the visit at the field, the French Mission returned to Paterson, N. J., to see the Wright Aeronautical Corp. plant.

L. F. Bender, general district manager for the Fokker corporation, upon his recent return from Wheeling, W. Va., reported satisfactory progress in the creation and completion of the new plant located there. Machinery is now being installed, and the new factory will be ready for occupancy and operation by June 15. The Panama plant of the Fokker corporation has been increased 5,000 sq. ft., making the capacity of the combined Wheeling and Panama plants, approximately 10,000 sq. ft. and the personnel of the Atlantic Aircraft Corp. has again been increased accordingly, to meet the demand for Fokker aircraft.

## Camden, N. J.

A. H. Kowler, president of the Kowler-Battner Aircraft Co., Inc., of Hagerstown, Md., piloted one of his company's new three plane OX-5 Challengers from the Kowler-Battner private field at Hagerstown to the Cresskill Airport, Cresskill Boulevard and Kuyper's Avenue, recently. His transatlantic aviation business in Camden and Philadelphia and returned to the factory by train the following day. The Challenge to New Jersey was piloted by Vincent D. Kowler, sales representative for the Cresskill Air Service, Inc., operator of the Cresskill Airport.

Capt. E. D. C. Horne, who flew with the Royal Flying Corps during the World War and who now lives in South Jersey, has been a frequent visitor to the Cresskill Airport. He has handled several important sky-writing contracts in connection with a representative of the Sky-Writing Corp. of America.

Several members of the House Naval Affairs Committee flew to the Cresskill Airport, recently, to attend the seventh annual banquet of the House of Representatives and the Naval Aeronautics League. In the party were Edward P. Warren, Assistant Secretary of the Navy in Charge of Aeronautics; Adam W. A. Moffitt, Chief of the Bureau of Aeronautics; Adm. J. L. Bellinger, Commandant of the Fourth Naval District, Congressman Charles A. Waverly, of the First New Jersey District, and other members of the House committee.

The visiting plane was escorted by the Cresskill Airport

at the plane of the Cresskill Air Service. They were piloted by John J. Stevenson, the company's new chief pilot, and Capt. Henry Dore, World War War and now chief instructor of pilot for the Cresskill organization. Officials of the House of Representatives were present in both planes—OX-5, Douglas Challengers.

## Portland, Ore.

J. John F. Anderson

Capt. Jack Gammath, chief pilot of the Apex School has moved a hangar from Washington, D. C., containing a plane which he will soon make to break the altitude record in his OX-5 powered Travel Air biplane. Officials of the Apex Club of Oregon will supervise the flight.

James Kinsler, 23 year old fair who has been building his own airplane, has just completed the first airplane to be added to the Portland, Ore. H. H. of the previous type and is in passenger service at Eastern Beach Park this summer.

F. S. Anderson, business man of Boise, Idaho, is probably the first man in the Northwest to operate a sales plane for the business community. Anderson, who is a shipowner, recently purchased a sales plane from The Eastern Air Force, and will use it to visit his ranches in Idaho, Oregon, and Montana. The home airport will be Boise, Idaho, and a full time pilot will be employed by Anderson and his associates. His plane will carry four passengers.

## Fitch, Kan.

Edison W. Frew

The first step in the organization of an adequate municipal airport for the city has been taken by the city council. At a recent meeting, they authorized a \$50,000 bond issue which will be made the first payment on a section of land, or sale square, what is called the "Oklahoma section".

The present airport, near the Travel Air factory, is only a few acres in extent. The city council's action was taken by Capt. C. H. Hultine, who is in charge of the survey of the 1000 acres for the Wright Aeronautical Corp. of New Jersey, and that the present field will be inadequate in the future. The Transcontinental Air Transport, Inc. of Fitch, Kan., has designated in a division point in the Transcontinental iron-pipe plant, which is a large field and established within the next few weeks, to be used.

The total cost of the \$40 acre field will be \$40,000. However, the field is in length will be encountered. The field is six or seven miles from the city, the new station at the present field. It is a single land, with natural drainage.

## Phoenix, Ariz.

R. E. Gough

Much interest was shown by the aviation fans of Phoenix, Ariz., recently when a large Fokker F-30 plane landed at the Phoenix Airport, an airline from New Jersey to Los Angeles. The plane, piloted by James King, attracted much attention.

The city of Phoenix had been selected as one of the stops to be made by the plane by reason of its position on the southern Transcontinental route, its remodeled airport, and its growing enthusiasm of the community in aviation. This plane has visited many of the principal cities of the country in a 100-day tour sponsored by the Engineering Foundation in its promotion of aeronautics and its study of the possibilities of a model direct passenger service between Los Angeles and Phoenix.

The visitors were met by a large delegation of Phoenixites upon the plane, which has seven passengers, including David E. La, a representative of the Western Air Express, Hugh Kohn, chief test pilot of the Fokker manufacturer and a visiting pilot of the plane; Henry C. Meier, manager of the

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